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ABSTRACT

The 1974-75 in-depth study was designed and conducted as an exploratory investigation of program and contextual factors related to achievement. The study was conducted in conjunction with the National Evaluation of the Emergency School Aid Act (ESAA). The analysis of school success was guided by a conceptual model that identified four key dimensions of a reading and math program, each of which were found to be significantly related to reading or math gain, independent of student background characteristics. These four dimensions are: (1) organizational climate, which produced a composite index of administrative leadership and a measure of district-level support for new teachers that predicted math gain; (2) parent and community involvement, which produced an index of parent participation in the classroom that predicted both reading and math gain; (3) reading and math program characteristics, which resulted in three indices that predicted achievement gains: the use of behavioral objectives, the provision of adequate instructional practice, and less frequent use of positive reinforcement; and (4) reading and math resource use, which uncovered a relationship between achievement gain and per-pupil costs for remedial specialists. (RC)

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An In-Depth Study of Emergency School Aid Act [ESAA] Schools: 1974-1975

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AN IN-DEPTH STUDY OF
EMERGENCY SCHOOL AID ACT (ESAA) SCHOOLS: 1974-1975

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July 1976

This study was conducted under the Emergency School Aid Act National Evaluation, United States Office of Education Contract Numbers OEC-0-73-0831 and OEC-0-73-6336

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TM-5236/010/00

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Also gratefully acknowledged are the recommendations and comments of the Evaluation National Advisory Panel (ESAA), whose members are listed on the preceding page of this report. One of the panel members--Dr. Seymour Feshbach--played an active role, making major substantive contributions to the instrumentation that was used in the study.

Among members of our own staff we are especially grateful to the following people: Dr. Raymond Stewart, who saw to it that we had the resources we needed to conduct the study; Dr. Dean Lee, who had major responsibility for recruiting and training our very able interviewer/observers; Dr. Dan Ozenne and Dr. Clarence Bradford, who provided guidance for our data analysis strategies; Ms. Kean Mantius and members of the editorial staff, who supported us through interminable rewrites; Dr. Ralph Melaragno, who reviewed the final drafts; and Ms. Janet Chryssanthis, who did much of the typing herself, supervised other typists, and remained unflappable throughout.

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The views reflected in this document are not necessarily the views of the U.S. Office of Education. Furthermore, no endorsement of the report by any individual, or the panel acknowledged above is implied.

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OVERVIEW

EVALUATION OF THE EMERGENCY SCHOOL AID ACT

Under contracts from the U.S. Office of Education, System Development Corporation (SDC) is conducting an evaluation of two closely related programs authorized under the Emergency School Aid Act (ESAA)--the Basic Grants Program and the Pilot Grants Program. The Basic program accounts for 64 percent of the annual appropriation for ESAA, and the Pilot program accounts for 15 percent.

Basic Grants are awarded to eligible school districts to encourage the reduction of minority-group isolation, to meet the special needs incident to the elimination of segregation and discrimination, and to assist elementary and secondary school children in overcoming the educational disadvantages associated with minority-group isolation. During fiscal years 1974 and 1975, applicants for the grants were encouraged to focus their programs on improving basic skills. Basic Grants are generally awarded (1) to Local Education Agencies (LEAs) that are implementing a desegregation plan, or have adopted and will implement such a plan if assistance is made available; (2) to LEAs that plan to enroll non-resident children in their schools to reduce minority-group isolation; and (3) to LEAs that have no desegregation plan but have minority-group student enrollment exceeding 50 percent, provided that the LEAs establish or maintain at least one integrated school.

Pilot Grants are awarded to LEAs for unusually promising projects designed to overcome the adverse effects of minority-group isolation by improving the academic achievement of children in minority-isolated schools. To be eligible for a Pilot Grant, an LEA must be implementing a desegregation plan or a plan to reduce minority-group isolation that would make it eligible for a Basic Grant. In addition, at least 15,000 minority-group students must be enrolled in the schools of the LEA, or minority-group students must constitute more than 50 percent of the total LEA enrollment.

The Act authorized a national evaluation of its programs that may be supported by an annual reservation of up to one percent of appropriated ESAA funds. As designed by the U.S. Office of Education and conducted by System Development Corporation (SDC), the national evaluation effort focuses on the integrated evaluation of the ESAA Basic and Pilot programs.

EVALUATION OBJECTIVES

The ESAA Basic and Pilot evaluations have several major objectives, some of which involve analyses of data collected within a single school year, while others involve longitudinal analyses and comparisons of data collected over two or three years. The key study objectives are summarized below. Findings related to the last objective are the subject of this report.

- Identify and describe the needs of students in or from minority-isolated schools; the characteristics of local programs, including relationships between student needs and resource allocations; and the interrelationships of student needs, program characteristics, and program impact.

- Determine the short-term and long-term national impact of the program relative to congressionally authorized program objectives.

- Determine the relative effectiveness of desegregation, compensatory education, and a combination of these, as compared to minority-isolated schools with no special intervention.

- Investigate the relationships among regular school expenditures, supplemental ESAA expenditures, and program impact.

- Document and disseminate information on local programs and program components that appear related to success.

GENERAL METHODOLOGY

The basic design of the combined Basic/Pilot evaluation involves comparison of treatment (ESAA-funded) and control (non-ESAA-funded) schools. To select the treatment and control schools, pairs of similar schools were identified in sample districts; one school of each pair was randomly assigned to the treatment condition and the other to the control condition. Sample students were then drawn randomly across classes in each sample school in grades 3, 4 and 5 in the elementary schools; and grades 10, 11, and 12 in the secondary schools.

The combined Basic/Pilot evaluation involves the collection of data in both the treatment and control schools over a period of three years, beginning with the 1973-1974 school year. Standardized achievement tests are administered at the beginning and end of each school year to assess gains made in reading and math by the sample of students participating in the ESAA evaluation. Two other student outcome measures also are considered in the multi-year evaluation: students' perception of discrimination (school climate), and the reduction of minority-group isolation.

In addition to the outcome measures, questionnaires and other recording forms are used once each year to obtain data on the school programs themselves (in both treatment and control schools) and about sample students. These instruments provide data on policies and procedures of the district and school; class and program characteristics; student exposure to reading and math instruction; resource allocation; and student and staff background characteristics.

Data analyses, designed to focus on the major evaluation goals stated above, have been conducted for the first two years of the ESAA longitudinal evaluation.* The longitudinal evaluation of ESAA will provide a broad description of Pilot and Basic treatment and control schools in terms of outcome measures, major program emphasis, and funding patterns--it cannot provide a detailed, comprehensive description of each program operation at each particular school. Therefore, in an attempt to supplement the longitudinal evaluation of the ESAA Grants Programs, the Office of Education has called for an in-depth analysis of selected schools to be conducted during the second year (1974-1975) and third year (1975-1976) of the ESAA evaluation. The remainder of this overview describes the 1974-1975 in-depth study.

IN-DEPTH STUDY OF SUCCESSFUL PROGRAMS

The in-depth examination of selected schools is intended to provide:

- Detailed documentation of successful school programs and the contexts in which they operate.
- A description and assessment of program components that differentially affect student academic achievement.
- A description of the schools' environment in terms of desegregation/segregation (equality of educational opportunity).
- A description of resources used in reading and math program components.
- Estimates of reading and math program costs.

RESEARCH METHODOLOGY OF THE IN-DEPTH STUDY

Five constructs representing the major components of reading and math programs and the context in which they operate were examined in the in-depth study. Previous research indicates that the variables comprising each construct may be related to student achievement. One of the constructs, equality of educational opportunity (EEO), was of interest quite apart from its relation to student achievement, since it is a major outcome measure of the ESAA evaluation. The five constructs that defined the conceptual focus of the in-depth study are:

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*Comprehensive documentation of methodology and findings is contained in:

Coulson, J.E., Ozenne, D.G., Bradford, C., Doherty, W.J., Duck, G.A., Hemenway, J.A., and Van Gelder, N.C. The Second Year of Emergency School Aid Act (ESAA) Implementation. Santa Monica, California: System Development Corporation, 1976.

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- Organizational climate
- Parent and community involvement
- Characteristics of reading and math instruction
- Resource use in reading and math instruction
- Equality of educational opportunity

School Selection

Schools selected for in-depth study were visited by specially trained interviewer/observers during the spring of the 1974-1975 school year. Consequently, the program components of the in-depth schools were analyzed in relation to 1974-1975 achievement outcome measures. However, the schools had to be selected for study on the basis of 1973-1974 data, since 1974-1975 background, program, and achievement data were not available prior to the time they were to be visited.

The schools eligible to be selected for in-depth study consisted of all treatment and control schools for which both pretest and posttest data were available for 1973-1974, and that remained in the study for 1974-1975. This population consisted of 22 secondary schools and 101 elementary schools. At each grade level, an average adjusted posttest score in reading and in math (based on 1973-1974 achievement data) was computed using pretest score as a covariate. Reading and math scores were ranked, and the ranks were averaged across grade levels. After the schools were ranked for achievement gain, a three-dimensional sampling matrix was constructed with the following classification variables: urban versus rural location of the school, school location based on national geographic sector, and percent minority enrollment.

"Successful" and "nonsuccessful" schools were then chosen based on three factors: (1) their proximity to one another within the sampling matrix, (2) whether the predominant minority was the same, and (3) whether the socioeconomic level of students was similar. The sampling methodology resulted in the selection of 24 elementary schools, of which 15 schools were ranked in the upper 40 percent in reading and math, and nine schools were ranked in the lowest 40 percent. The two groups of schools were matched on the basis of similarity in percent and type minority, and socioeconomic level of students. The matching procedures did not yield a comparable set of successful/nonsuccessful secondary schools. Consequently, to fill the sample quota of 30 schools, six secondary schools were selected from the top of the ranked order of reading and math achievement. Schools selected for study included both treatment and control schools.

Data Collection

Two interviewer/observers were assigned two to four schools for study. The interviewer/observer teams received no information on the achievement rank of the schools they visited. (Achievement rank was not available to any member of the in-depth project until all site data were collected and descriptive analyses were completed.) Each team made an initial two-day orientation visit to their assigned schools, at which time they scheduled interview appointments, practiced the use of observational protocols (in classes not selected for study), and identified the classes that were to be studied. These were the two classes at each grade (third, fourth, and fifth; or tenth, eleventh, and twelfth) that contained the majority of the students who were participating in the ESAA evaluation. After a final debriefing with training personnel (at SDC), the teams returned to spend two weeks at each school for data collection.

Three types of instruments were used to collect data during the two-week school visits: observational protocols, interview schedules, and self-administered questionnaires.

Classification of Successful/Nonsuccessful Schools

Although the in-depth study schools were selected on the basis of 1973-1974 achievement scores, program and contextual data were collected on the schools in the spring of 1975. Consequently, schools were classified as successful or nonsuccessful on the basis of 1974-1975 achievement gain.

All schools in the study sample were ranked in terms of the number of grades tested that showed improvement between pretest and posttest in national percentile ranks. Two separate rankings were derived, one for reading achievement and one for math achievement. A school was classified as successful if at least two of the three grades tested showed improvement in national percentile ranks for reading or math.* Nonsuccessful schools were those that did not meet this criterion.

Based upon the criterion noted above, nine elementary schools were classified as successful in reading, and those same nine schools plus five other elementary schools were classified as successful in math. Although more elementary schools met the criterion of success in math achievement than in reading, the scores in reading and math were highly correlated.

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*One exception was made to the classification rule. In one school, two grades were tested in reading and three were tested in math. In reading, one of two grades tested showed improvement in percentile ranks; in math all three that were tested showed improvement. This school was classified as successful in both reading and math.

At the secondary level, only one of the six schools selected for study showed sufficient improvement in reading or math achievement to be classified as successful. This finding, as well as other characteristics of the secondary schools (e.g., in the large schools, ESAA students were distributed over so many classes that only three or four were in any one reading or math class), led to a decision to focus the in-depth analysis exclusively on the 24 elementary schools.

As noted previously, the in-depth study schools were originally selected in such a way that higher- and lower-ranking groups of elementary schools were similar in percentage of minority enrollment and socioeconomic status. The realignment of successful/nonsuccessful elementary schools based upon 1974-1975 achievement did not seriously distort the comparability of the two groups. For the reading achievement criterion, higher- and lower-ranked schools were not statistically different in terms of percent minority enrollment, socioeconomic status, or 1974 pretest score. For the math achievement criterion, the more successful schools tended to have a lower percentage of minority students and lower pretest scores. In analysis of the math data, the effects of percent minority student enrollment and pretest score were taken into account.

A second measure of success in the ESAA national evaluation concerns students' perceptions of discrimination in the school. When the in-depth study schools were selected, no measure of discrimination was available. Schools were therefore selected on the basis of achievement alone. However, a student questionnaire to measure student perceptions of discrimination was developed by a panel of experts in civil rights, in minority group relations, and in survey and evaluation research (Coulson, et al, 1976). The resulting School Climate Questionnaire was administered to all students participating in the ESAA evaluation in the fall and spring of the 1974-1975 school year. Therefore, a measure of change in students' perceptions of discrimination was available for the year in which the in-depth schools were studied (1974-1975).

In the on-site study of the schools, particular attention was paid to various indices of equality of educational opportunity (EEO). However, since the indices of EEO compared treatment accorded majority and minority students, and students' perceptions of discrimination, the EEO analysis was limited to 16 of the 24 elementary schools that were desegregated (i.e., schools that had less than 90 percent student enrollment of a single racial/ethnic group).

Data Analysis Procedures

Many of the data in the in-depth study were obtained at the classroom level. However, the analysis was primarily concerned with examining variations among schools in program characteristics since school-level patterns are better indicators of a coordinated school program. School-level patterns are more amenable to policy intervention than individual classroom activities, which are likely to result from idiosyncratic teacher characteristics and teaching styles.

Data collected at the classroom level were analyzed for consensus. That is, when two or more observations were made in a class, the data were averaged to obtain a class-level indicator; then class-level indicators were examined to determine if there was a dominant pattern that characterized the school. Those characteristics on which consensus was achieved were presumed to reflect school-level patterns. These school-level patterns were analyzed for their relationship to reading and math achievement.

The in-depth analysis of successful schools made use of several different statistical techniques. Due to characteristics of the data, several nonparametric tests were used to examine the relationship of individual program components to student achievement (e.g., chi-square, phi). In addition, discriminant function analysis was used in a multivariate analysis of school success to assess the relative importance of the program and contextual characteristics that appeared to differentiate successful from nonsuccessful schools.

MAJOR FINDINGS AND RECOMMENDATIONS

READING AND MATH ACHIEVEMENT

The in-depth study was designed to provide detailed descriptions of a group of schools participating in the ESAA evaluation. The major objective of the study was to identify program and contextual components that were related to student achievement. To meet this objective, elementary schools that were successful in reading or math were compared to a group of schools that were less successful in reading or math but similar in other respects. Successful and nonsuccessful schools were compared in terms of four major constructs.

- Organizational climate
- Parent and community involvement
- Instructional practices used in reading and math, and related teacher attitudes
- Instructional resources used in reading and math

In addition, observations were made of activities related to equality of educational opportunity.

Four of these dimensions were found to be significantly related to reading or math gain, independent of student background characteristics.* More specifically, from the dimension of organizational climate a composite index of administrative leadership and a measure of district-level support for new teachers predicted math gain. Similarly, the analysis of parent and community involvement produced an index of parent participation in the classroom that predicted both reading and math gain. The analysis of reading and math program characteristics resulted in three indices that predicted both reading and math gain: the use of behavioral objectives, the adequacy of instructional practice, and less frequent use of positive reinforcement. Finally, the examination of reading and math resource use uncovered a relationship between achievement gain and per-pupil costs for remedial specialists.

EQUALITY OF EDUCATIONAL OPPORTUNITY (EEO)

The analysis of EEO in the in-depth study was based primarily on observed patterns of intergroup relations in 16 desegregated elementary schools. The major descriptive findings from this analysis were as follows:

- In 13 of the 16 desegregated schools no segregated classes were observed.
- In 10 of the desegregated schools no teacher-assigned segregated seating arrangements within desegregated classes were observed.
- In nine of the 16 desegregated elementary schools, at least four of the five or six observed classes used some multi-ethnic materials.
- Teachers were observed directing a disproportionate amount of negative behavior (e.g., criticizing, ignoring, isolating) toward minority students in five schools; majority students were observed to receive a disproportionate share of negative teacher behavior in two schools.
- Student intergroup mixing during recess and lunch was observed in 12 of the 16 desegregated elementary schools.
- Eight of the 16 desegregated elementary schools showed improvement in student perceptions of EEO as measured by the School Climate Questionnaire.

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*Significance was determined by assessing the probability that a relationship was due to chance. Relationships were considered statistically significant if the probability of a chance relationship was 10 or less in 100 (chi square test with Yate's correction, Fisher's Exact Test or t-test). While .10 may be a somewhat less customary alpha level than .05 or .01, it was used in this study for two reasons: one, the small sample size decreased the likelihood of stable estimates of significance; and two, since this was an exploratory study it was important to report relationships that might be used to generate hypotheses. However, most findings reported were in fact significant at the .05 level.

The EEO analysis was also concerned with the interrelationships among the variables of interest. Several key findings emerged from this analysis:

- Student intergroup mixing was significantly more likely to be observed in schools that contained no segregated seating patterns within desegregated classes.
- Student perceptions of teacher-student interaction were significantly more likely to improve at schools where parent visitors were representative of the racial/ethnic composition of the student body.
- Desegregated schools were significantly less likely to have a disproportionate amount of negative behavior directed toward minority students when the principal placed greater emphasis on social goals.
- Desegregated schools were significantly more likely to use multiethnic materials when teachers reported greater participation in decisions regarding the implementation of intercultural curricula.

It was also found that desegregated schools were less likely to show improvement in student perceptions of teacher-student interaction when teachers were observed directing a disproportionate amount of negative behavior to minority students. In addition, study results indicated that desegregated elementary schools were significantly less likely to show reading achievement gain when teachers were observed directing a disproportionate amount of negative behavior toward minority students.

MULTIVARIATE ANALYSIS OF SCHOOL SUCCESS

The major objective of the in-depth study was to identify program variables that appeared to be related to achievement gain. A final analysis was conducted to develop a composite profile of successful schools that distinguished them from less successful schools. This distinction required using several different program dimensions as predictor variables in one integrated analysis.

A stepwise discriminant function analysis,* using the criterion categories of successful-nonsuccessful in reading and math achievement, was selected for this purpose. The discriminant analysis was conducted in two steps. In the first step, only student background characteristics (percent minority enrollment, socioeconomic level of the student body, and 1974 pretest score) were entered into the equation. In the second step of the analysis each program variable found to be related to achievement gain (in the bivariate analysis) was added to the equation in a stepwise fashion. Variables were entered into the equation based on their contribution to the overall prediction capability of the function, which was determined by the proportion of residual variance explained by each variable.

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*The objective of the discriminant function analysis is to predict an _a priori_ classification of cases (e.g., successful schools versus unsuccessful schools) based on a linear combination of predictor variables. The discriminant analysis performed in this study is similar to a stepwise regression analysis in which the dependent variable is dichotomized. Each discriminant function coefficient represents the relative contribution of its associated variable to the function in question.

The procedures outlined above were performed separately for reading and math achievement. For the reading criterion, no significant relationship was found between the racial composition of the student body, the pretest score (1974), or the socioeconomic level of the student body. However, it was necessary to consider the effects of student background on math achievement, since systematic differences were found among successful and nonsuccessful schools in racial composition and pretest score.

Reading Achievement

The optimal combination of program variables for predicting the reading criterion, ranked in order of their relative contribution to the total discriminant function score, was:

- Adequacy of instructional practice
- Parent involvement in the classroom
- Use of behavioral objectives for reading
- Use of positive reinforcement (a negative relationship)
- Per-pupil costs for remedial reading specialists

Based on the information contained in this equation, all 24 elementary schools were correctly classified as successful or nonsuccessful. In short, schools successful in raising reading achievement appeared to provide students with adequate practice periods and to involve parents in the classrooms as volunteers, visitors or paid aides. Also important, though somewhat less so, were the use of behavioral objectives, and the infrequent use of praise and pointing out students as positive models. In addition, higher per-pupil costs for reading specialists was related to reading achievement.

Math Achievement

The optimal prediction equation for the math criterion combined five program and two background components, listed below in order of their relative contribution to the total function score:

- Percent minority enrollment (a negative relationship)
- Per-pupil costs for remedial math specialists
- Parent involvement in the classroom
- Pretest math score (a negative relationship)
- The use of behavioral objectives for math
- Administrative leadership
- District-level support for new teachers

Perfect prediction of the math criterion was obtained from the information contained in this equation; that is, all 24 elementary schools were correctly classified as successful or nonsuccessful. Schools successful in raising math achievement were distinguished most clearly by two variables that were also important to reading achievement: higher per-pupil costs for remedial specialists and parent involvement in the classroom. As was the case with reading achievement, several additional variables contributed to success, though somewhat less so--the use of behavioral objectives, administrative leadership, and district-level support for new teachers also appeared to affect math achievement.

In addition to the accuracy of these prediction equations, one interesting observation is that both equations contain a similar set of program components, although the relative contribution of each component differs from one equation to the other. Thus, in the ESAA in-depth study, the elements of a composite profile of school success common to both reading and math achievement included:

- Parent involvement in the classroom
- Higher per-pupil costs for remedial specialists
- The use of behavioral objectives

In addition, the following were key program components in the prediction of reading *or* math achievement:

- Adequacy of instructional practices
- Administrative leadership
- District-level support for new teachers
- Less frequent use of positive reinforcement

DISCUSSION AND RECOMMENDATIONS

It must be emphasized that the success of the analyses reported above does not demonstrate causality between these program components and student achievement. It should be noted that the in-depth sample was not representative of the total school or student population in the nation. Most of the students in this study, as in the overall evaluation sample, fell within the bottom quartile in reading and math achievement scores. Moreover, the in-depth study was not based on experimental design, and the study sample was relatively small and non-randomly selected. Thus, one or more of the above findings could be spurious, resulting from sampling error or systematic "non-program" differences that existed among the successful and nonsuccessful schools prior to the in-depth study. On the other hand, it should be noted that the pre-existing differences that were examined (percent minority enrollment, socioeconomic level of the student body, and pretest score) do not appear to explain the relationships obtained in this analysis.

The importance of this study's findings lies in the fact that school program characteristics do appear to make a difference in student achievement. If these findings accurately reflect the factors that lead to school success, intervention policies can be implemented that will have a strong likelihood of improving student achievement in reading and math.

Although the sample of schools in the in-depth study was small, the data collection and analysis methodology was relatively more rigorous and nonsubjective than previous studies that attempted to examine reading and math programs operating in particular school contexts. Consequently, it is of interest that this study's findings tend to support results of several previous studies.*

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*See, for example:

Hawkridge, D.C., Chalupsky, A.B., and Roberts, A.O.H. A Study of Selected Exemplary Programs for the Education of Disadvantaged Children. (Parts I and II.) Palo Alto, California: American Institutes for Research, 1968.

Wargo, M.J., Tallmadge, G.K., Michaels, D.D., Lipe, D., and Morris, S.J. ESEA Title I: A Reanalysis and Synthesis of Evaluation Data from Fiscal Years 1965 through 1970. Palo Alto, California: American Institutes for Research, March, 1972.

In view of the findings reported here, ESAA, as well as other federal grants programs with similar objectives, should emphasize particular activities that appear to be related to student achievement. ESAA funds are targeted for schools that are making efforts to eliminate segregation and discrimination, and for schools with minority isolated children. The funds are intended to assist these schools in improving the quality of education they provide to their students. In terms of this objective, the in-depth study appeared to confirm the usefulness of two specific activities for which ESAA authorizes funds: the provision of remedial services; and the preferential hiring of parents as classroom aides (P.L. 92-318, Sec 707(a)). ESAA also authorizes funds for inservice teacher training. Although the relative contribution to academic achievement was somewhat less than the use of remedial specialists and parent involvement in the classroom, district-level support for new teachers--which consisted largely of inservice training--was found to be associated with improvement in math.

Several other program variables related to success in the study schools may not be as amenable to legislative action, but might usefully be reflected in future program guidelines or in the criteria for evaluating grant applications. Specifically, the following instructional practices appeared to contribute to success in raising reading and/or math achievement: the use of instructional objectives; the provision of structured practice sessions; deemphasis of praise and pointing out students as positive role models; and administrative leadership that focused on basic instruction and communicated that focus effectively.

Because of the important study limitations described above, conclusions drawn from this study must be tentative. However, if the 1975-1976 ESAA in-depth study offers cross-validation of these findings, we can be reasonably confident that program variables that make a difference in student achievement have been identified.

CHAPTER I

INTRODUCTION

The Emergency School Aid Act (ESAA) was enacted into law in June, 1972 to provide elementary and secondary school districts with financial assistance to (1) meet the special needs incident to the elimination of minority-group segregation and discrimination; (2) encourage the voluntary reduction, elimination, or prevention of minority-group isolation; and (3) aid children in overcoming the educational disadvantages of minority-group isolation (P.L. 92-318, Sec. 702(b). While the Act, as amended in 1974 (P.L. 93-380, Sec. 641), authorized the appropriation of $1 billion each for fiscal years 1973 through 1976, actual appropriations for those years have amounted to $228 million, $234 million, $215 million, and $215 million respectively. Since funds are appropriated prior to the fiscal year which requires the expenditures, the major thrust of the Act began during school year 1973-74 and will continue at least through school year 1976-77.

ESAA originally granted both state-apportioned and discretionary grants*. The state-apportioned sums are appropriated annually, and are divided among states on the basis of the ratio of their number of minority-group school-aged children to the number of such children in all states. Local school districts compete for the funds apportioned to their state through grant applications to their HEW Regional Office. In applying for an ESAA grant, a local school district must demonstrate that it has needs related to the Act's objectives and that it has designed a program based on authorized activities that show promise of achieving one or more of the Act's objectives.

DESCRIPTION OF ESAA EVALUATION

Under contracts from the U.S. Office of Education, System Development Corporation (SDC) is conducting an evaluation of two closely related programs authorized under the Emergency School Aid Act (ESAA)--the Basic Grants program and the Pilot Grants program.

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*ESAA originally authorized eight subprograms; three state apportionment programs (Basic Grants, Pilot Grants, and Nonprofit Organization Grants); and five discretionary grant programs (Bilingual Education, Educational Television, Metropolitan Area, Special Projects, and Evaluation). The Metropolitan Area subprogram and its 3 to 4 percent appropriation from the annual budget was eliminated from the program by Section 642 of P.L. 93-380 in August, 1974. Since that amendment, and in accordance with statute and regulations, 87 percent of the annual appropriation is reserved for the state-apportioned programs: 64 percent for Basic Grants; 15 percent for Pilot Programs; and 8 percent for Nonprofit Organization Grants. The remainder of the appropriation is reserved as follows for the discretionary programs: Bilingual Education, not less than 4 percent; Educational Television, 3 to 4 percent; Special Projects, 5 percent; and Evaluation, up to 1 percent.

Basic Grants are awarded to eligible school districts to encourage the reduction of minority-group isolation, to meet the special needs incident to the elimination of segregation and discrimination, and to assist elementary and secondary school children in overcoming the educational disadvantages associated with minority-group isolation. During fiscal years 1974 and 1975, applicants for the grants were encouraged to focus their programs on improving basic skills. Basic Grants are generally awarded (1) to Local Education Agencies (LEAs) that are implementing a desegregation plan or have adopted and will implement such a plan if assistance is made available; (2) to LEAs that plan to enroll nonresident children in their schools to reduce minority-group isolation; (3) to LEAs that have no desegregation plan but have minority-group student enrollment exceeding 50 percent, provided that the LEAs establish or maintain at least one integrated school.

Pilot Grants are awarded to LEAs for unusually promising projects designed to overcome the adverse effects of minority-group isolation by improving the academic achievement of children in minority-isolated schools. To be eligible for a Pilot Grant, an LEA must be implementing a desegregation plan or a plan to reduce minority-group isolation that would make it eligible for a Basic Grant. In addition, at least 15,000 minority-group students must be enrolled in the schools of the LEA, or minority-group students must constitute more than 50 percent of the total LEA enrollment.

The Act authorizes a national evaluation of its programs that may be supported by an annual reservation of up to 1 percent of appropriated ESAA funds. As designed by the U.S. Office of Education and conducted by System Development Corporation, the national evaluation effort focuses on an integrated evaluation of both the ESAA Basic and Pilot programs. The remainder of this chapter summarizes the major evaluation objectives of these programs and describes the general methodology being applied to meet those objectives.

EVALUATION OBJECTIVES

The ESAA Basic and Pilot evaluations have several major objectives, some of which involve analyses of data collected within a single school year, while others involve longitudinal analyses and comparisons of data collected over two or three years. The key objectives of both evaluations are summarized below. This report provides information on successful local programs and program components (see objective listed last).

- Identify and describe the needs of students in or from minority-isolated schools; the characteristics of local programs, including the relationships between student needs and resource allocations in the sample districts; and the interrelationships of student needs, program characteristics, and program impact.

- Determine the short-term and long-term national impact of the program relative to congressionally-authorized program objectives; namely, to reduce minority-group isolation, to eliminate discrimination, and to improve student basic skills in elementary and secondary schools.
- Determine the relative effectiveness of three forms of educational intervention--(desegregation, compensatory education, and a combination of these)--to achieving the stated goals, as compared to minority-isolated schools who receive no special intervention.
- Investigate the relationships among regular school expenditures, supplemental ESAA expenditures, and program impact, in an attempt to determine local program cost-effectiveness and the minimum supplemental expenditures necessary to ensure some degree of program success.
- Document and disseminate information on local programs and program components that appear related to success in attaining the desired goals.

GENERAL METHODOLOGY

The combined Basic/Pilot evaluation involves the collection of data over a period of three years, beginning with the 1973-1974 school year. This multiyear design allows analyses of cumulative program impact and provides an opportunity to assess program maturation effects (e.g., greater program impact on each successive wave of new students in the second and third years of operation).

For both Pilot and Basic programs, standardized achievement tests are administered at the beginning and end of each school year to assess gains made in reading and math by the sample of students participating in the ESAA projects. The same tests are given to samples of students in both treatment (ESAA-funded) and control (non-ESAA-funded) schools. To select the treatment and control schools, pairs of similar schools were identified in the sample districts; one school of each pair was randomly assigned to the treatment condition and the other to the control condition. Sample students were then drawn randomly across classes in each sample school at the grade levels of interest. Thus, the experimental or treatment variable in this study is the award or denial of ESAA Pilot or Basic funds to a school.

To properly evaluate the ESAA program, both elementary and secondary schools were investigated. The Basic Grant program sample includes both elementary and secondary schools; however, the Pilot Grant program sample includes only elementary schools, since so few Pilot Grants were awarded at the secondary level. Grades included in the evaluation are elementary grades third, fourth, and fifth; and secondary grades tenth, eleventh, and twelfth. The use of three successive grades at each school level allows individual sample students to be followed longitudinally for up to three years, depending on their grade placement at the start of the evaluation. To be eligible for inclusion in the study, the schools selected were required to have sufficiently large numbers of ESAA participants (or ESAA-eligible students, in the case of control schools) to allow for attrition over the evaluation period. Toward this end, larger student samples were initially drawn from grades three and ten than from the other grades.

Two other major outcome measures also are considered in the multi-year evaluation: (1) student perception of discrimination (school climate), and (2) reduction of minority-group isolation. School climate data were not available in year one but are included in the year two analysis. Minority-group isolation is primarily a district-level rather than a school-level variable, which makes it of little use in school-level impact analyses. At the district level, isolation data are available for districts in the 1974-1975 evaluation sample, but not for any meaningful universe or sample of comparable non-ESAA districts. Therefore, the major use of the minority-group isolation data in the second year of the evaluation is an attempt to relate district or program characteristics to differences in minority-group isolation among the sample districts.

In addition to the outcome measures, questionnaires and other recording forms are used once each year to obtain data about the school programs themselves (in both treatment and control schools) and about the sample students. Near the end of each school year, a battery of questionnaires is administered to the school superintendents, district business managers, local ESAA coordinators, principals, teachers, and students in the sample. These questionnaires provide data on district, school, and class characteristics; program operation; resource allocation; and student and staff background characteristics.

Finally, student activity logs are used to record the amount of time that a student is exposed to different types of educational experiences (e.g., peer tutoring in math, cultural enrichment programs). The logs provide a cumulative record of each student's interactions with the educational system, with emphasis on compensatory activities of the sort presumably stressed by ESAA projects.

Data analyses, which will focus on the major evaluation goals described above, are designed to (1) assess overall gains across both treatment and control schools by determining changes in outcome measures through pretests-posttests; (2) evaluate the impact of the experimental variable (ESAA funding) by comparing pretest-posttest gains in the matched treatment and control schools; (3) compare the outcomes associated with different intervention approaches; (4) identify particularly successful program characteristics by ranking the impact of local programs; and (5) analyze the relationships among program features, student characteristics, and program impact.

In connection with the second-year evaluation, an in-depth study of 30 schools was conducted in an attempt to identify local program components that differentiate successful from nonsuccessful programs. The remainder of this introduction and the subsequent chapters of this report describe the in-depth study.

IN-DEPTH STUDY OF SUCCESSFUL PROGRAMS

The longitudinal evaluation of ESAA will provide a broad description of Pilot and Basic treatment and control schools in terms of outcome measures, major program emphasis, and funding patterns. This evaluation, based upon data collected from all the schools in the sample (by means of student achievement tests, student school climate questionnaires, and self-administered questionnaires completed by school and district personnel), cannot provide a detailed, comprehensive description of program operation at particular sites. To supplement the longitudinal evaluation of the ESAA Grants programs, the Office of Education has called for an in-depth analysis of selected schools to be conducted during the second (1974-1975) and third (1975-1976) years of the ESAA evaluation. The in-depth examination of selected sites is intended to provide:

a. Detailed documentation of successful school programs and the contexts in which they operate.

b. Description and assessment of program components that differentially affect student academic achievement.

c. Description of the schools' environment in terms of desegregation/segregation (equality of educational opportunity).

d. Description of resources used in reading and math program components.

e. Estimation of reading and math program costs.

CONCEPTUAL FOCUS OF THE ESAA IN-DEPTH STUDY

Five constructs represent the major components of reading and math programs and the context in which they operate. Previous research indicates that the variables comprising each construct may be related to student achievement. One of the constructs, equality of educational opportunity, is of interest quite apart from its relation to student achievement, since it is a major outcome measure of the ESAA evaluation. The five constructs that define the conceptual focus of the in-depth study are:

- Organizational climate
- Parent and community involvement
- Characteristics of reading and math instruction
- Resource use in reading and math instruction
- Equality of educational opportunity

A brief overview of these program components is provided below. In subsequent chapters of this report, results from the in-depth study are presented for each of these areas.

Organizational Climate

Many studies have indicated that the organizational context of school programs is an important component of school success (Clark, 1972A, 1972B; Cohen and Bredo, 1974; Levine, 1966; Lutz and Evans, 1968; Weber, 1971). One of the most prominent areas of research concerns the long-range objectives of organizations such as schools (Blau and Scott, 1962). On the one hand, the school must be concerned with the welfare of its clients--its mission is to teach and prepare students to become functioning members of society. On the other hand, the school must be concerned with its own organizational imperatives for administrative efficiency and with the concern of the professional staff for their own status and career development. It seems reasonable to expect that schools will differ in the extent to which they emphasize institutional, administrative, and student-oriented goals, and that these differences may be related to academic achievement.

Another characteristic of school organizations that may be related to student achievement is the extent to which teachers and administrators are committed to similar goals and instructional techniques. Closely related to this notion is the extent to which teachers participate in policy decisions or feel that their interests are reflected in the decision-making process (Spillane, 1967). A case study of New York City schools (New York Office of Education Performance Review, 1974) provides support for this hypothesis; many factors that accounted for school effectiveness in improving reading achievement were closely associated with administrative behavior, policies, and practices. This study also found that the successful school was one that had identified student achievement as a problem and had developed an integrated set of practices and procedures to support the classroom teachers.

The in-depth study examined organizational climate within the context of previous research. This research identified many different dimensions of organizational climate, the following five of which were investigated: (1) teacher participation in policy decisions; (2) long-range objectives of the school; (3) administrative supervision and guidance; (4) staff support; and (5) teacher satisfaction.

Parent and Community Involvement

Concern with the level of parent and community involvement in school is based on the belief that parent participation will enhance the effectiveness of the school and raise student achievement. A recent study in New York (cited earlier) reported that parent involvement was related to school success. The federal government has made parent and community involvement a condition for obtaining funds in several of its educational programs (e.g., Head Start, Follow Through, Title I, ESAA). This requirement has been imposed, in part at least, in the belief that parent participation will increase academic achievement.

In this study, particular attention was given to identifying the role of parent involvement in the selected schools. Specific activities used to promote parent involvement were described, as well as the overall effectiveness of these activities in promoting community interest in school. The relationship between parent involvement and school success was also examined in detail.

Characteristics of Reading and Math Instruction

Previous studies have shown that certain kinds of instructional practices may be related to successful learning for particular groups of students (e.g., Amidon and Hunter, 1966; Averch, Carroll, Donaldson, and Kresling, 1972; Berlinger and Cahen, 1973; Domino, 1968; Doty, 1967; Feshbach, 1972-1973; Flanders, 1962; Mann, 1967; Popham and Baker, 1970; Weinter, 1972).

In recent years, several different trends have become evident in instructional practices and there is much variation in both the instructional programs used and the methods of delivery. Some schools place a heavy emphasis upon individualized instruction by reducing the student-to-instructor ratio through the use of small classes, by using classroom volunteers and instructional aides, and by instituting peer and cross-age tutoring. The attempt here is gear instruction to the pace, interests, and needs of the individual student. By contrast, certain schools, particularly for low-achieving students, attempt to produce highly structured and consistent instructional practices through the use of programmed learning texts. Such programs may allow little room for either individualized instruction or teacher innovation.

Some schools also have implemented programs that include students of several age groups and grades in the same classes, while others have set up resource centers or learning laboratories. Such centers may serve either as the primary means of instruction, or as a supplement to more traditional instructional practices, where students can avail themselves of audiovisual materials and expert help as their needs or interests dictate. Yet other variations include the use of team teaching or cooperative teaching; some use aides and/or volunteers; and some use special, remedial, or resource teachers.

One of the primary objectives of the ESAA in-depth study was to describe the reading and math programs at the selected school sites and determine which configurations of instructional techniques were most likely to benefit student achievement. The conceptualization of this task, as the above discussion suggests, involved considering many different aspects of instructional programs. Included among the array of variables investigated were the following major components of reading and math programs:

a. Teacher attitudes related to reading and math instruction, including attitudes toward student learning, instructional objectives, selected instructional techniques, daily lesson plans, and progress tests.

b. Teacher use of specific instructional techniques, including small-group and individualized instruction, positive instructional reinforcement, instructional feedback, and diagnostic testing.

c. Teacher use of specific instructional resources, including support staff, and instructional equipment and materials.

Resource Use in Reading and Math Instruction

With the recent decline in the financial base for purchasing instructional resources, decision-makers and school administrators must determine which of the available resources are the most effective in contributing to the development of basic skills among students, and also which strategies are most productive for using these resources in the school and classroom. Recent research provides some general guidance regarding effective resource allocations. For example, on the basis of an extensive review of the literature, one study (Averch, et al., 1972) proposed that: (1) increased expenditures in the areas of traditional educational practices are not likely to improve educational outcomes substantially, and (2) significant redirections, and in some cases even reductions, in educational expenditures would not likely impair educational outcomes.

Merely increasing the dollar expenditures for student services, without regard for the resources that make a difference in student performance, will probably not improve the basic skills of low-achieving students. Some studies (Summers and Wolfe, 1975; Education Turnkey Systems, 1974) have shown that certain types of resources are far more important in contributing to student achievement than others. For example, the Michigan study found that the schools with the more successful educational programs spent proportionately more money on compensatory education teachers, while the less successful school programs spent proportionately more money for instructional aides.

The in-depth study attempted to take these prior studies into consideration by focusing on the major types of instructional resources used in providing reading and math services to students of the observed classes. The primary concern was to identify patterns in the way resources were used among successful schools that set them apart from less successful schools.

Equality of Educational Opportunity

The promotion of equality of educational opportunity (EEO) for minority-group students is one of the major legislative objectives of the Emergency School Aid Act.

In the in-depth study, desegregated schools were examined with respect to the frequency of segregated classrooms; the existence of racial and ethnic seating patterns in class; the amount of classroom material depicting inter-group interaction; the frequency with which the school sponsors cultural enrichment activities; the level of participation in cocurricular activities; and the amount of instructional reinforcement given to majority and minority students.

EEO analyses focused upon two areas of study and involved two outcome measures: (1) student perceptions of EEO, and (2) student achievement. The primary area of interest was the relationship between the observable measures of school discrimination and student perceptions of EEO. Student perception measures of EEO were derived from the School Climate Questionnaire used in the combined Basic/Pilot evaluation. School climate information served as a useful criterion to assess one of the main objectives of the ESAA evaluation: the reduction of minority-group isolation and discrimination. The second area of interest was the relationship between measures of school discrimination and student achievement. The objective here was to determine whether observed patterns of school discrimination were significantly related to student achievement in desegregated schools. In general, this analysis explored how student perceptions of EEO might be related to school practices and to student achievement.

OVERVIEW OF RESEARCH METHODOLOGY IN THE IN-DEPTH STUDY

This report probably will have several different audiences, each with its own particular interests and knowledge. These potential audiences include Congress and the Office of Education, civil rights and other advocate groups, district-level program administrators, educational researchers, and evaluation specialists.

Because the primary goal of the in-depth study is to provide information that will be helpful to decision-makers, rather than to add to the literature on evaluation methodology, the major focus throughout this report is on results, not techniques. However, since in-depth studies of successful schools represent a relatively new line of inquiry in national program evaluation, a discussion of the analytical techniques that were used is presented in Appendix A.

This section presents a brief overview of the methodology employed in the study, including the criteria for school selection, the interviewer-observer selection and training, data collection, and general data analysis procedures.

School Selection Criteria

Schools selected for in-depth study were visited during the spring of the 1974-1975 school year. Consequently, the program components of the in-depth schools were analyzed in relation to 1974-1975 achievement outcome measures. However, schools had to be selected for study on the basis of 1973-1974 data, since the background, program, and achievement data for 1974-1975 were not available prior to the time schools were to be visited.

Schools eligible to be selected for in-depth study consisted of all treatment and control schools for which both pretest and posttest data were available for 1973-1974, and that remained in the study for 1974-1975. This eligible population totaled 22 secondary and 101 elementary schools. At each grade level, an average adjusted posttest score in reading and in math (based on 1973-1974 achievement data) was computed using the pretest score as a covariate. The reading and math scores were ranked, and the ranks were averaged across grade levels. After the schools were ranked for achievement gain, a three-dimensional sampling matrix was constructed using the following variables as classification factors: urban versus rural location of the school, school location based on national geographic sectors, and percent minority enrollment.

"Successful" and "nonsuccessful" schools were then chosen based on three factors: (1) their proximity to one another within the sampling matrix, (2) whether the predominant minority was the same, and (3) whether the socioeconomic level of students was similar. The sampling methodology resulted in the selection of 24 elementary schools, of which 15 schools were ranked in the upper 40 percent in reading and math, and nine schools were ranked in the lowest 40 percent. The two groups of schools were matched on similarity in percent and kind of minority students and socioeconomic level of students. The matching procedures did not yield a comparable set of successful-nonsuccessful secondary schools. Consequently, to fill the sample quota, six secondary schools were selected from the top of the ranked order of reading and math achievement. The numbers of successful and nonsuccessful elementary and secondary schools are shown in Table I-1. Schools selected for study included both treatment and control schools.

Table I-1. Number of Successful and Nonsuccessful Schools Selected for In-Depth Study*

School Level	Number of Schools		
	Successful	Nonsuccessful	Total
Elementary	15	9	24
Secondary	6	0	6
Total	21	9	30

*Based on 1973-1974 achievement data.

Staff and Training for Interviews and Observations

To ensure that all needed data were collected as objectively as possible, a comprehensive training program was developed specifically for the in-depth study data collection requirements. A staff of 16 persons was selected for the data gathering. All field data collectors had prior academic training in education and/or extensive experience in educational settings; all were experienced interviewers; and, in addition, several had prior experience in formal observation.

The training program lasted one week and included the following activities: observation and analysis of filmed classroom behavior; observation of videotaped and filmed instructional programs stressing behaviorally referenced objectives; role-playing experience in "depth" interviewing techniques; lesson plan and student record analysis; and practice in the use of instruments in "live" situations, with subsequent debriefing.

Data Collection

Each team of two interviewer/observers was assigned two to four schools for study. The interviewer/observer teams received no information on the achievement rank of the schools they visited; school identity and associated achievement rank were known only by the head and the assistant head of SDC's ESAA analysis section. Information on achievement rank was not available to any other ESAA project member until all site data were collected and returned to SDC.

Each team made an initial two-day orientation visit to their assigned schools at which time they identified the classes that were to be studied. These were the two classes at each grade level (third, fourth, and fifth, or tenth, eleventh, and twelfth) that contained the majority of the students who were participating in the ESAA evaluation. The teams then returned to the schools for two weeks of data collection.

Three types of instruments were used to collect data during the two-week school visits: observational protocols, interview schedules, and self-administered questionnaires. Structured observational protocols were used to record school characteristics and the activities, behavior and resources in the two classes of each grade of interest. Additionally, the school principal and the teachers of the observed classes completed questionnaires and were interviewed.

Observations are less obtrusive than direct questions, and are especially useful when the respondent is unable to provide accurate and/or unbiased information. Observational protocols were developed for collecting data in the classroom on lesson plans, classroom grouping practices, student-teacher interactions, English as a second language, student involvement in activity, classroom instruction, instructional equipment, classroom resources, physical characteristics of the classroom, content of materials, and lunchroom and recess activity. At the school level, observational protocols were used to record data on the physical condition of the school, library use, parents' room use, and cocurricular activities.

Interviews are especially useful in obtaining information that is not readily observable, or when the respondent's own opinions, values, or assessments are of primary interest. Interviews were used in this study to collect information from teachers and administrators on the following subjects: long-range objectives, policy development, administrative control of the classroom, support for teachers, staff satisfaction, parent participation, student records, and discipline of students.

Self-administered questionnaires were used for teachers, principals, and, where appropriate, other staff members, such as counselors and assistant principals. Items for which considered and/or detailed responses were desired were included in the questionnaires. The teacher self-administered questionnaire included items on philosophy of instruction, class information, and resource use; the principal questionnaire inquired about resource availability.

Data Analysis Procedures

Considerable data collected for the in-depth study were obtained at the classroom level. However, this analysis is primarily concerned with examining variations among schools in program characteristics. As discussed more fully in Chapter II, school-level patterns are better indicators of an articulated school program. These patterns seem more amenable to policy intervention than individual classroom behaviors, which are likely to result from idiosyncratic teacher characteristics and teaching styles.

Data collected at the classroom level were analyzed for school-level consensus. That is, after averaging multiple classroom observations (where necessary) to obtain class-level indicators, these indicators were examined to determine if a dominant pattern characterized the school. Those characteristics on which consensus was achieved were presumed to reflect school-level patterns. Criteria used in establishing consensus are described in Chapter II.

The in-depth analysis of successful schools made use of several different statistical techniques. Due to the characteristics of the data, several nonparametric tests were used in conjunction with cross-classification or contingency tables (e.g., chi-square, phi). In addition, discriminant-function analysis was used in a multivariate analysis of school success to identify program and school characteristics associated with that success. Appendix A provides a more detailed discussion of these analyses procedures. The methodology used for determining resource use and calculating standardized cost figures for instructional resources used in the reading and math programs is described in Appendix B.

STUDY LIMITATIONS

The in-depth study was designed as an exploratory investigation of program components that characterize successful and nonsuccessful schools. Part of its mission is to point to areas that may be fruitful to explore in further research to gain a better understanding of the forces that influence student achievement. Findings reported in this study should be interpreted with caution, taking into account certain limitations imposed by our study design.

First, the in-depth study was not a true experiment. Neither schools nor students were randomly assigned to the different treatment conditions or program approaches being compared; rather, the study depended upon natural program variations among the selected schools. In such a design, school outcome differences attributed to program variations may, in fact, reflect uncontrolled differences in other variables, such as socioeconomic status or other background characteristics of students. Procedures that adjusted statistically for non-randomized variations in certain student and school characteristics other than the program variables of interest were used in this study. However, these procedures are inherently less effective than a true experimental design. Interpretations concerning causal relationships between program characteristics and outcome measures must be tentative. Nevertheless, the study does provide evidence of possible causal and policy-relevant relationships involving school success.

Second, the in-depth school sample was in no sense representative of the total school or student population in this country. Most students in this study, as in the overall evaluation sample, fell within the bottom quartile of national rankings in reading and math achievement scores. Consequently, "successful" schools are actually successful relative to the total evaluation sample and not to the general school population. Similarly, relationships found here between program characteristics and school success can at most be generalized only to schools like those in the ESAA evaluation, and may not apply to schools with pronounced differences from those studied.

Third, the small number of schools in the in-depth study limited the types of data analyses that could be performed, and the number of variables that could be simultaneously examined in multivariate analyses. Some of these constraints are discussed further in Chapter VIII, in connection with the application of discriminant function analysis procedures.

Other constraints arise in the study's use of program indices for which no good external benchmarks are available. For instance, one index concerned the number of classrooms having multi-ethnic materials, while another concerned the frequency of observed interactions among students of different racial/ethnic groups. Since no data are available on these measures outside the in-depth sample schools, there are no normative or comparative standards; therefore, the designation of certain ranges of index values as "high" or "low" must be largely arbitrary. Scale scores used in this study are used solely to compare the in-depth schools with one another and carry no connotation that a high score is good, or that a high score among the in-depth schools would be high among all schools.

Finally, the study does not address grade-level and class-level variations in math and reading program characteristics since the objective is to describe school-level patterns and relate them to school success; the larger ESAA evaluation study examines class-level and grade-level variations.

CHAPTER II

SCHOOL RANKING: CRITERIA AND PROCEDURES

The purpose of the study documented here is to analyze schools' differing program operations and to determine which variations are associated with differential success in their reading and math programs. This chapter describes the procedures used for classifying successful and nonsuccessful schools in this study, and the methods used for aggregating data so that program and contextual characteristics could be related to school success.

SCHOOL SUCCESS

ACADEMIC ACHIEVEMENT

The following achievement tests were used in the ESAA evaluation to assess academic growth:

a. In elementary schools, the California Achievement Test, Levels 2 and 3, Forms A and B. Subtests focused on reading vocabulary, reading comprehension, math computation, math concepts, and math problems.

b. In secondary schools, the Iowa Test of Basic Skills for reading vocabulary and reading comprehension; the California Achievement Test, Level 5, Form A and B for math computation, math concepts, and math problems.

A "debiased" scoring system (i.e., a scoring system that excludes items that are potentially biased against minority students) was developed for these tests; however, it was determined that differences between the full-scale scores and the debiased scale scores were trivial and non-significant (Ozenne, Van Gelder, and Cohen, 1974). As a result, calculations of student achievement scores were based on the full set of items originally included in the test battery (Tiegs and Clark, 1970).

It was noted in Chapter I that schools were selected for in-depth study on the basis of reading and math achievement gain for 1973-1974. Fifteen elementary schools were selected from the top 40 percent in achievement gain in reading and math. A comparison group of nine schools were selected from the bottom 40 percent; these nine schools were similar to the higher-ranked schools in percentage minority enrollment and socioeconomic status. The same procedure could not be followed in selecting secondary schools for the study sample, since reasonable matches between high-ranked and low-ranked schools could not be found. Therefore, since the primary interest of the study was on the characteristics of successful schools, six high-ranked secondary schools were selected for description and comparison.

Although the in-depth study schools were selected on the basis of 1973-1974 achievement scores, program and contextual data were collected on the schools in the spring of 1975. Consequently, schools were classified as successful or nonsuccessful on the basis of 1974-1975 achievement gain.

All schools in the study sample were ranked in terms of the number of grades tested that showed improvement between pretest and posttest in national percentile ranks. Two separate rankings were derived, one for reading achievement and one for math achievement. A school was classified as successful if at least two of the three grades tested showed improvement in national percentile ranks for reading or math. Nonsuccessful schools were those that did not meet this criterion.

One exception was made to the two-of-three grades rule. In one school, two grades were tested in reading and three were tested in math. In reading, one of the two grades showed improvement in percentile ranks; in math all three showed improvement. This school was classified as successful in both reading and math.

Based upon the criterion noted above, nine elementary schools were classified as successful in reading, and the same nine schools plus five other elementary schools were classified as successful in math. Although more elementary schools met the criterion of success in math achievement than in reading, the scores in reading and math were highly correlated ($r = .76$). Table II-1 shows the distribution of elementary schools that improved in national percentile ranks for reading and math achievement.

At the secondary level, only one of the six schools selected for study showed sufficient improvement in reading or math achievement to be classified as successful. This finding, as well as other characteristics of the secondary schools (e.g., five of the six schools were segregated; and in the large schools, ESAA students were distributed over so many classes that only three or four were in any one reading or math class), led to a decision to focus the in-depth analysis exclusively on the 24 elementary schools.

As noted previously, the in-depth study schools were originally selected in such a way that higher- and lower-ranking groups of elementary schools were similar in percentage of minority enrollment and socioeconomic status. As one might expect, the ranking of schools for the 1974-1975 achievement gain differed somewhat from the 1973-1974 ranking. Changes in rank position likely resulted from a number of causes, including the following: some schools may have responded to poor student performance by improving services provided to students; 1974-1975 rankings were based on a more stringent criterion (percentile gain) than 1973-1974 rankings; and, in dealing with such small samples, there is a strong possibility of some measurement error.

Table II-1. Number of Elementary Schools Showing Improvement in National Percentile Ranks for Reading and Math During 1974-1975

Reading Achievement		Math Achievement	
Percentage of Grades Tested Showing Improvement in Percentile Ranks	Number of Schools	Percentage of Grades Tested Showing Improvement in Percentile Ranks	Number of Schools
Successful:		Successful:	
100% (3/3)	3(12.5)	100% (3/3)	7(29.2)
66% (2/3)	5(20.9)	66% (2/3)	7(29.2)
50% (1/2)*	1(4.2)		
Nonsuccessful:		Nonsuccessful:	
33% (1/3)	11(45.8)	33% (1/3)	8(33.3)
0% (0/3)	4(16.6)	0% (0/3)	2(8.3)
	24(100%)		24(100%)

*One school was tested for reading achievement in two grades only.

As shown in Table II-2, 12 of the 24 elementary schools maintained their position in reading (six of 15 stayed successful, six of nine stayed nonsuccessful). In math, nine of the 24 schools maintained their position (seven stayed in the successful category and two remained in their original nonsuccessful position).

The realignment of successful/nonsuccessful elementary schools based upon 1974-1975 achievement did not seriously distort the comparability of the two groups. For the reading achievement criterion, higher- and lower-ranked schools were not statistically different in terms of percent minority enrollment, socioeconomic status, or 1974 pretest score. For the math achievement criterion, the more successful schools tended to have a lower percentage of minority students and lower pretest scores. In the discriminant function analysis of the math data (reported in Chapter VIII), statistical adjustments were made for these latter differences. In addition, it should be noted that the results reported in Chapter III through VII are strongly supported in the discriminant function analysis, thus indicating that these student background characteristics were probably not a source of spurious correlation in the in-depth study.

Table II-2. Number of Elementary Schools That Maintained Their Relative Ranking Between 1973-1974 and 1974-1975

		1974-1975 Reading Rank		
		High	Low	
1973-1974 Reading Rank	High	6(40.0)	9(60.0)	15(62.5)
	Low	3(33.3)	6(66.7)	9(37.5)
		9(37.5)	15(62.5)	24(100%)

		1974-1975 Math Rank		
		High	Low	
1973-1974 Math Rank	High	7(46.7)	8(53.3)	15(62.5)
	Low	7(77.8)	2(22.2)	9.37.5)
		14(58.3)	10(41.7)	24(100%)

SCHOOL CLIMATE AND EQUALITY OF EDUCATIONAL OPPORTUNITY

A second measure of success in the ESAA national evaluation concerns students' perceptions of discrimination in the school. A student questionnaire was developed for the evaluation by a panel of experts in the fields of civil rights, minority-group relations, and survey and evaluation research (Coulson, Ozenne, Bradford, Doherty, Duck, Hemenway, Van Gelder, 1976). The resulting School Climate Questionnaire was administered to all students participating in the ESAA evaluation in the fall and spring of the 1974-1975 school year.

When the in-depth study schools were selected, no pretest and posttest measure of discrimination was available; schools were therefore selected on the basis of achievement alone. However, for the year in which the schools were studied (1974-1975), the measure of change in students' perceptions of discrimination was obtained. In the on-site study of the schools, particular attention was paid to various indices of equality of educational opportunity (EEO). In the analyses reported in this document, results from the investigation of EEO were related to findings from the School Climate Questionnaire.

Separate school climate instruments were developed for elementary and secondary schools. In addition, two forms were developed for each level. Form A was designed to be administered in desegregated schools (less than 90 percent minority or majority enrollment), while Form B was designed for segregated schools (more than 90 percent enrollment of one racial/ethnic group).

EEO data collected from the in-depth study schools were analyzed by comparing the treatment accorded to minority and to majority students. Consequently, findings on EEO are almost entirely restricted to the 16 elementary schools that had less than 90 percent of one racial/ethnic group of students, and relational analyses were conducted with Form A of the School Climate Questionnaire.

Two multiple-item indices of student perceptions were derived from the School Climate Questionnaire, one consisting of six items that dealt with student perceptions of classroom teacher-student interactions, and the second consisting of three items that concerned students' perceptions of the principal.*

It should be noted that the psychometric properties of these scales are somewhat problematic. For example, all scale items were pretested for test-retest reliability during the summer of 1974. Test-retest reliability was estimated from two test administrations, barely one week apart. The percentage of elementary students (N = 750) giving the same response averaged around 67 percent for the Teacher-Student Interaction Scale items, and 78 percent for the items in the Treatment by Principal Scale. Moreover, the average inter-item correlation for the Teacher-Student Interaction Scale was .17, while the Treatment by Principal Scale fared somewhat better in averaging .34. The alpha coefficients for the internal consistency averaged around .58 for each scale. Although both of the student perception scales lack a strong psychometric foundation, they appear to have high face validity. Furthermore, as will be indicated in Chapter VII, the Teacher-Student Interaction Scale was found to be correlated with the on-site observational measure of teacher-student interaction, which covered the same areas.

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*The Teacher-Student Interaction Scale covers the following five areas of interaction: how often the teacher says something nice to the student; how often the teacher calls on the student in class; whether the teacher gives the student sufficient time to respond to questions; how often the teacher extends privileges to the student; how much responsibility the student is given.

The Treatment by Principal Scale includes items that cover: whether the principal knows the student by name; whether the principal is friendly to the student; and whether the principal treats the student fairly.

Student change scores for the 1974-1975 school year were calculated for both of the student perception scales. The amount of individual student change on each scale was then averaged, providing a school-level measure of aggregate change. On the Teacher-Student Interaction Scale, eight desegregated elementary schools showed reduction in perceived discrimination and seven showed no change or increased perception of discrimination; data were missing for one school. The Treatment by Principal Scale shows the same breakdown: eight schools showed less perceived discrimination, seven schools showed the same or increased perceived discrimination, and the data were missing for one school.

AGGREGATION OF CLASS-LEVEL DATA TO THE UNIT OF THE SCHOOL

Many types of data collected in the in-depth study were obtained at the classroom level. However, for several reasons this analysis is primarily concerned with examining school-level variations in program characteristics rather than class- or grade-level variations. Reasons for using the school as the basic unit of analysis include the following:

a. Schools were selected for in-depth study on the basis of school-level achievement ranking. Students qualifying for ESAA-funded services within a school were relatively homogeneous in terms of the criteria used to establish ESAA eligibility (e.g., academic need). Thus, when the in-depth study sample of schools was originally selected, little within-school variability in achievement was found among the grades selected for study in the national evaluation (grades 3, 4, and 5 in the elementary schools; and grades 10, 11, and 12 in the secondary schools). Since schools were selected on the basis of school-level outcome, it seemed appropriate in the analysis to look at school-level independent variables.

b. A primary objective of the total ESAA evaluation, including the in-depth study, is to identify manipulable variables that are related to student achievement. In working with characteristics of the school, non-manipulable idiosyncratic teacher characteristics are thus given less analytic attention.

c. ESAA grant funds were provided to the schools, in most cases, to implement programs that affected all or many of the grades in the school. In all but one of the study schools, at least the third, fourth, and fifth grades were targeted for ESAA services. The fact that school-level programs were supported with ESAA funds argues for describing the programs at the school level.

The data collected at the classroom level were aggregated to the school level in the following manner. First, classroom observations of specific behaviors (e.g., amount of positive instructional reinforcement) that were made more than once were averaged to obtain a class-level indicator. Then, the class-level indicators were aggregated to the school level. The extent of response agreement at the school level was then determined for each indicator. The criteria used for determining school-level consensus are shown in Table II-3.

Table II-3. Consensus Criteria for Determining School-Level Indicators from Classroom-Level Responses

Number of Agreeing Responses	Total Number of Responses
At Least	Out of
2	2
2	3
3	5
4	6
5	7
5	8
6	9
7	10
7	11
8	12
8	13
9	14
10	15

If school-level consensus was obtained, the school was assigned the agreed-upon item value. If consensus was not obtained, the school was scored NC (no consensus) and given a "low" score on the attribute of interest. Items scored for consensus consisted almost entirely of classroom observation items and items reported on the structured response forms for the teacher interviews. It should be noted that very few items in this analysis failed to reach consesus.

Thus, one very important finding from the in-depth study is that the students qualifying for ESAA-funded services tended to share similar educational experiences within a school.

One important exception to the consensus rule should be noted. In the analysis of equal educational opportunity, class-level variations have been reported because instances of inequality in one or two of the observed classes within a school were considered important, even though in terms of the consensus criteria described above, this would not constitute a school-level indicator.

CHAPTER III

ORGANIZATIONAL CLIMATE

The assumption underlying the examination of organizational climate in the in-depth study schools is that schools vary substantially in the way they are organized and in the way their organizational patterns are perceived by the school staff. Moreover, it is assumed that certain aspects of school organization may be related to student achievement.

Five major dimensions of organizational climate have been examined, and are reported on in this chapter. Some of the issues addressed in the analysis of each dimension are specified below:

- *Policy Development*: To what extent are decisions shared by administrators and teachers? What are the consequences of greater or lesser involvement in particular decision areas, especially the ones that teachers regard as more important? To what extent do the administrators share responsibility for policy decisions in successful schools with teachers?

- *Long-Range Objectives*: Do schools benefit when teachers and administrators share goals? Does the type of goal make a difference?

- *Administrative Guidance and Supervision*: Is supervision and guidance by administrators relevant to school success? Does promotion by the administration of an instructional philosophy and program relate to student achievement?

- *Support For Teachers*: Do schools where teachers have greater access to specialists and resources for professional development produce more academically successful children? Do policies and procedures to aid new teachers have an effect on student achievement?

- *Teacher Satisfaction*: Teacher satisfaction, along with effective learning, is viewed as a basic indicator of a "healthy" school climate. Such satisfaction, it may be speculated, *results in* academic achievement, *results from* the same conditions that lead to achievement, and *results from* student achievement itself, as well. Is teacher satisfaction associated with other characteristics of organizational climate; in particular, to teacher participation in decision-making, administrative guidance, and professional support?

The information contained in this chapter bears directly on each of the above issues. Scoring procedures and analysis tables are found in Appendix C. References to the tables are given parenthetically in the text of this chapter, for example: (C-1) or (C-15. $\phi = .49$, $\alpha = .02$), where "C" indicates the section of the appendix and the number, "1" or "15", indicates the specific table.

VARIABLE DEFINITION AND SOURCE, AND DESCRIPTIVE ANALYSIS

POLICY DEVELOPMENT

The type of policy development occurring within the in-depth study schools was investigated in two aspects:

- The extent to which teachers participate in decisions, relative to administrators.
- The agreement among staff on the relative importance of policy decision areas.

Participation in Decisions

The extent to which teachers participate in policy decisions was determined by presenting teachers and principals with seven decision areas. Respondents were asked to rate each area for amount of teacher participation, using a five-point scale, where a rating of 1 indicated that decisions were made by administrators with little or no input from teachers, and a rating of 5 indicated that decisions were made by teachers with little or no assistance from administrators. Table III-1 shows the number of schools giving low, medium, and high estimates of teacher participation for each of the seven decision areas.

As can be seen from the table, there was a tendency for principal estimates of teacher participation to be greater than teacher estimates. In some areas, such as student grouping procedures, the difference was slight. But in one area, school-community interaction, the difference was substantial; teachers estimated that they participated little and principals estimated that teachers participated a great deal. Not only were principal estimates consistently higher than teacher estimates, but, in addition, teacher and principal estimates were not parallel. That is, comparing one school with another, where a principal gave a high (or low) estimate compared to other principals, teachers showed no particular tendency to give a similarly high (or low) estimate compared to teachers at other schools. Since there is considerable difference between principal and teacher responses, this report distinguishes clearly whether teacher or principal estimates are being used in analyses of teacher participation.

Teachers in a majority of schools estimated their participation to be low in two areas (focus and eligibility requirements for teacher inservice training, and school-community interaction); moderate in three areas (selection of basic

Table III-1: Amount of Teacher Participation in Policy Development

Decision Area	Number of Schools						
	Ratings By Teachers			Ratings By Principals			
	Low	Med	High	Low	Med	High	MD
● Selection of basic instructional materials	3	16	5	4	5	15	
● Student grouping procedures	2	6	16	1	4	19	
● Student grading procedures	4	12	8	5	6	13	
● Kinds and availability of co-curricular activities	3	19	2	5	3	16	
● Focus and eligibility requirements for teacher inservice training	15	9	0	10	4	10	
● School-community interaction	12	8	4	3	6	15	
● Implementing intercultural curricula	2	12	10	2	5	16	1
● Average for all areas combined	3	19	2	5	15	4	

Operational Procedures:

Low = 1.0 to 2.9

Med = 3.0 to 3.9

High = 4.0 to 5.0

MD = Missing Data

Ratings by teachers were averages of all sample teachers at a school.

instructional materials, student grading procedures, and kinds and availability of co-curricular activities); high in one area (student grouping procedures); and moderate or high in one area (implementing intercultural curricula). Principals in a majority of schools estimated teacher participation high in all areas except one (focus and eligibility requirements for teacher inservice training), where the amount was judged low as often as high. The average amount of participation for all areas was moderate in a large majority of schools, as calculated from either teachers' or principals' estimates.

Importance of Decision Areas and Agreement Among Staff

In addition to estimating the extent to which decisions are shared, teachers and principals also ranked the seven decision areas from most important through least important. The rankings were analyzed to determine the amount of agreement they implied. It was found that teachers agreed among themselves on the overall relative importance of decision areas in nearly all schools (22 of the 24 elementary schools).* Not only was there agreement within schools, but it is evident that teachers in general, irrespective of the school, shared similar views of which decision involved in their work was most important. The decision area of selection of basic instructional materials, was ranked first by most teachers in an overwhelming majority of schools.

Principals, however, differed among themselves regarding which decision area was most important. In 15 elementary schools, selecting basic instructional materials was most important to principals. In the remaining nine schools, one of the other areas was considered most important.

Agreement between teachers and principals occurred much less frequently than among teachers alone. Agreement between teachers and principals was significant in eight elementary schools and approached significance in another three schools.**

Two particular decision areas bear special mention as they relate to major issues in this study. A summary of each is presented below.

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*Agreement among teachers within a school was determined by using Kendall's coefficient of concordance with $\alpha \leq .05$ (see Appendix A).

**Agreement between teachers and principals was determined by using Spearman's rank order correlation coefficient with $\alpha \leq .05$ (see Appendix A).

a. Implementing Intercultural Curricula--This decision area was ranked least important among the seven areas by a majority of both teachers (sixth or seventh in 21 schools) and principals (fifth, sixth, or seventh in 22 schools). Teachers and principals tended to agree on its relative importance ($\phi = .35$, $\alpha = .06$).* Teacher participation was estimated by both teachers and principals as moderate or high in nearly all schools.

b. School/Community Interaction--This area was ranked important (first, second, third) by nine principals, moderate (fourth) by another nine, but of little importance (fifth, sixth, seventh) to teachers in 22 schools. Teachers and principals did not agree on its importance. Principals estimated teacher participation to be high or moderate in 21 schools. In contrast, teachers estimated their participation to be low or moderate in 20 schools.

LONG-RANGE OBJECTIVES

Elementary school teachers and principals were presented with 13 long-range objectives for schools. Table III-2 shows these goals grouped according to type.** However, type of goal was not indicated to the respondents and the goals were presented in random order.

Teachers and principals were asked to make selections among the goals in two ways. In one exercise, respondents were asked for their own ranking; in a subsequent exercise they were asked to indicate the ranking they believed would be assigned by the other(s), principal or teachers, whichever was the case. Each respondent was asked to select five of the alternatives and rank them from most important through least important. Results of the selection and ranking process were analyzed for agreement among school staff and for the relative emphasis placed on type of goal: institutional, academic, social, and psycho-emotional.

Agreement on School Goals

Teachers almost always agreed among themselves on the relative importance of school objectives. However, agreement between teachers and principals occurred

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*Phi (ϕ) measures the strength of a relationship and assumes values from 0 (no relationship) to 1 (the strongest relationship possible). Alpha (α) measures the significance of a relationship; that is, the probability that a relationship was due to chance (e.g., $\alpha = .05$ indicates the probability was 5 in 100).

**Type was determined by agreement on face validity among independent judges.

Table III-2: Long-Range Objectives Ranked by Teachers and Principals

Academic Goals

- Transmitting a thorough knowledge of subject matter to students who are motivated to learn
- Helping students acquire basic skills
- Responding to the individual academic needs of students

Psycho-Emotional Goals

- Increasing students' motivation and desire to learn
- Improving the self-image of students

Social Goals

- Helping students learn to live with persons who are of different racial or ethnic background
- Developing students' concern for others
- Helping students to appreciate the contributions of different cultures
- Developing curriculum which provides opportunities for meaningful interaction with persons of varied ethnic and racial backgrounds

Institutional Goals

- Improving the school buildings, grounds, facilities and equipment
- Developing an atmosphere of order and quiet in the school
- Developing an outstanding athletic and physical education program
- Developing an efficient administrative system in the school

in only eight schools.* The difference in perceptions of teachers and their principals is not surprising since, although they both work in the same institution and share responsibility for student learning, their daily tasks differ. In the same light, it is not surprising that teachers and principals were not very accurate in estimating how the other (teachers or principal) would rank school goals. Principals tended to perceive somewhat more congruence between themselves and their teachers than did teachers.

As part of the interview dealing with administrative guidance in instructional practices, teachers and principals were asked whether many faculty meetings were devoted to a discussion of instructional goals and methods. Teachers and principals were highly consistent in their responses to this question; in only four schools were their reports contradictory. In 12 schools teachers and principals both reported many such meetings. Schools in which teachers and principals agreed on long-range objectives were neither more nor less likely to have many faculty discussions of instructional goals. In addition to agreement on long-range objectives, agreement on the relative importance of decision areas was also examined. A pattern of agreement did not emerge: overall agreement between teachers and principals on particular long-term objectives was not associated with agreement on the relative importance of decision areas.

Relative Emphasis on School Goals

Teachers consistently ranked psycho-emotional goals as most important, academic goals second, social goals third, and institutional goals as least important (C-1). Principals displayed greater variability; that is, they were more likely than teachers to place some emphasis on all types of goals.

Psycho-emotional goals received the most emphasis in nearly all schools. At least two psycho-emotional goals were picked by principals in 13 and by teachers in 20 schools. Academic goals were emphasized to the extent that at least one such goal was ranked third or higher by principals in 16 and by teachers in all 24 elementary schools. At least one social goal was ranked third or higher by principals in 15 and by teachers in four schools. Institutional goals were ranked as least important; teachers in 18 and principals in 15 schools chose no institutional goals.

No patterns were evident between the rankings assigned by principals to long-range objectives and to decision areas. Principals who stressed academic goals were neither more nor less likely to be among the 15 who claimed that the selection of basic instructional materials was most important among decision areas. Similarly, principals who emphasized social goals were not necessarily those who placed greater emphasis on implementing intercultural curricula, as an issue of policy development.

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*Agreement among teachers within a school was determined by using Kendall's coefficient of concordance with $\alpha \leq .05$. Agreement between teachers and principals was determined by using Spearman's rank order correlation coefficient with $\alpha \leq .05$. (See Appendix A.)

ADMINISTRATIVE GUIDANCE AND SUPERVISION

In analyzing the influence administrators exerted on instructional practices in the classroom, a distinction was made between what we have called specific supervision and general guidance. In addition, the effectiveness of such efforts was assessed by determining how well teachers perceived instructional norms held by administrators.

General Administrative Guidance

Items used to assess general guidance on instructional practices were:

a. Whether many faculty meetings were devoted to a discussion of goals and methods.

b. Whether the administration arranged to have inservice training programs that stressed the kinds of teacher behavior desired by the administration.

c. Whether teachers were encouraged to discuss their teaching problems with the administrative staff.*

Correlational analysis strongly supported the construction of a composite measure of instructional guidance (C-2). According to teachers, of the 13 schools where the administration arranged to have inservice training programs stressing the kinds of teacher behavior it desired, nine also devoted many faculty meetings to instructional goals and methods. Conversely, of the 11 schools where such inservice training did not take place, only three schools spent many faculty meetings discussing goals and methods. Principals reported on these activities in similar numbers and proportions. In fact, the association between teacher and principal responses was even stronger than the inter-item associations. When the two items were combined into a score with a range of values from zero to eight, 13 out of 24 schools scored high (scale score = 6 to 8). Most of the remaining schools could be considered to provide a moderate amount of instructional guidance, with only three schools scoring low (scale score = 0 to 2).

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*This item was not used in scale construction due to a skewed response distribution. Nearly everywhere, teachers were encouraged to discuss problems.

Specific Administrative Supervision

Correlational analysis did not support a composite measure of supervision as it did with instructional guidance. Supervision was therefore analyzed by individual items that were coded from the teacher and principal interviews. These items were:

a. The frequency of visits to the classroom by an administrator.

b. Whether teachers were expected to send in special reports on students who could not keep up.

c. Whether the principal sent memoranda or directives to teachers stressing the kinds of things he/she wanted the teachers to do in class.

d. Whether the principal scheduled visits to classrooms in advance.

No inter-item associations were strongly positive. Principals, however, were consistent from one item to another; for instance, where they reportedly visited classrooms frequently, they also claimed to send memos stressing the kinds of things they wanted done in class.

Teachers appeared to have a different view of classroom supervision. In only four of the fifteen schools where teachers reported sending in special reports on students did they also report that the principal sent memoranda stressing the kinds of things to be done in class. Conversely, of the nine schools where they did not send in special reports, more than half reported that principals sent these directives.

Teachers and principals were highly consistent regarding the frequency of the principal's visits to the classroom. Frequency was considered low if less than once a month, moderate if once a week to once a month,* and high if more than once a week. Although principals tended to report a high frequency more often than teachers, in only three schools were principals and teachers strongly contradictory; that is, one reporting less than once a month and the other more than once a week. In 15 schools they were fully consistent.

Because teachers and principals agreed on the frequency of the principals' visits to classrooms, this item was singled out as a measure of supervision. Frequency of visits was low in seven elementary schools according to teachers and in six according to principals. The frequency was reported high in one school by teachers and high in seven schools by principals. In the remaining schools, visits were moderately frequent, once a week to once a month.

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*Also, in the case of teachers, if consensus was lacking.

Accuracy of Teachers' Perception of Principals' Instructional Norms

The effectiveness of attempts to influence teachers depends in part on how well the desires of the principal (or other administrators) are known and understood. Five specific instructional practices were presented to principals, who were asked to indicate which ones they espoused. Teachers were presented with the same items and asked to indicate which ones they believed to represent the principal's thinking. These items were:

a. With many students, basic skills should be set aside until the students are ready to learn.

b. Teachers should carefully plan their instruction in terms of specific short-term objectives.

c. Teachers should try to tailor instruction to the needs of individual students.

d. Teachers should use diagnostic testing and concentrate on students' weak areas.

e. Teachers should avail themselves of special help where needed, e.g., remedial teachers, counselors.

In a large majority of the schools, principals claimed to espouse all of these instructional practices; however, the number of schools in which teachers reported that principals believed in these practices was smaller. Disparities occurred most often on the practices of setting aside basic skills, and the use of short-term objectives.

A scale consisting of the number of times at least two-thirds of the teachers accurately perceived the principal's agreement or disagreement with each of the five above practices (items a through e) was constructed (C-3). We have interpreted this as a measure of the extent to which the principal effectively promotes the administrative point of view regarding instructional practices. In 14 schools, teachers accurately perceived the administrative point of view on four or five of the practices, while in the remaining 10 schools teachers were less accurate.

SUPPORT FOR TEACHERS

Three ways in which a school might support its teachers were analyzed:

- Procedures to integrate new teachers
- Availability of math and reading specialists
- Promotion of professional development

Teachers and principals were interviewed about a number of specific activities, facilities, resources, practices, and procedures to determine the extent to which a school engaged in support of each kind. Their responses are described below.

Integration of New Teachers

Teachers and principals were asked whether procedures for integrating new teachers existed at the school level and at the district level (C-4). According to both teachers and principals, orientation courses were given more by the district than by the school. Inservice training was provided with equal frequency by schools and districts. All other procedures were typically, though not exclusively, the domain of schools. The number of procedures claimed at either school- or district-level were not generally high. Teachers in 11 schools claimed no more than one at the district level. Nearly every procedure was claimed to exist by principals more often than by teachers. The number of inconsistent responses was quite high in a majority of schools: three or more for district-level procedures in 18 schools, and three or more for school-level procedures in 22 schools (C-5).

Specialist Availability

Teacher and principal interview reports of whether reading and math specialists were available rarely conflicted. Both claimed that reading specialists were provided more often (in 21 elementary schools) than math specialists (in 10 elementary schools).

Five ways that contact between teachers and a specialist could occur were also presented to the respondents in the in-depth study (e.g., teacher sends students to specialist, specialist confers with teacher) (C-6). Principals typically confirmed a larger number of such contacts than did teachers, but comparing one school with another, in each school the teachers and principal were generally in agreement. The only configuration of contact with specialists that emerged was that teachers who conferred regularly with the specialist on instructional methods and materials were also able to send their students to the specialist at any time.

Promotion of Professional Development

To assess how active schools were in providing opportunities for teachers to improve their professional skills and knowledge, both teachers and principals were asked whether the school did such things as subscribe to educational journals, provide special courses, or support attendance at professional meetings (C-7).

Differences between teacher and principal reports were apparent, but were generally modest. In only three schools were there differences on more than two of the 10 activities inquired about. Such differences may indicate poor use of resources and opportunities, as well as poor communication. The most glaring example was the item asking whether or not a school provided summer courses. In only five schools were at least two-thirds of the teachers aware of summer courses, whereas principals in 19 said the school provided them. Teachers tended to be uninformed about weekend courses as well. Since the value of these professional resources lies largely in their use, the teachers' responses were given somewhat more consideration in analysis. In spite of these differences, teacher and principal judgments on amount of professional opportunity were parallel; teachers affirmed a relatively greater number of opportunities at schools where the principal did likewise. This lent confidence to judgments about degree of professional development in the in-depth schools. Principals in 15 and teachers in 11 schools reported a large number (8 to 10) of opportunities for professional growth.

TEACHER SATISFACTION

Measures of teacher satisfaction were derived from the following five "yes-no" questions asked in interviews with principals and teachers:

- The teachers and school staff are a team working together to solve problems.
- Teaching in the school is rewarding.
- The school has a good reputation; teachers want to come to the school.
- The problems are overwhelming; little can be accomplished.
- Most teachers stay in the school because they have no choice.

The preponderance of responses indicated satisfaction. In eight schools, both teachers and principals gave responses indicating satisfaction on all five items. In 10, either principals or teachers did so. In only six schools did both teachers and principals indicate less than 100 percent satisfaction. A comparison of teachers' and principals' responses indicated that teachers reported dissatisfaction more frequently; that is, where discrepancies between teachers' and principals' responses occurred, teachers usually gave fewer responses indicating satisfaction than principals.

In addition to the data obtained through interviews, a questionnaire item descriptive of a teacher's classroom experience was used to assess job satisfaction. Teachers rated options to the item on a five-point scale from very characteristic to very uncharacteristic. The questionnaire item read as follows:

> "Basically, my classroom experience is characterized by:
>
> - Many discipline problems
> - Insufficient staff for the number of students
> - Satisfaction and enjoyment
> - Frustration and worry
> - Inadequate or inappropriate materials"

Five elementary schools scored distinctly high on job satisfaction as assessed by responses to the options; nine schools scored low. The remaining 10 schools fell within the moderage range.*

Questionnaire responses relating to satisfaction were consistent with interview responses, discussed earlier, so the two were combined by summing the coded scores for each source. The distribution of these scores is shown in Table III-3.

As can be seen in the table, teachers in 15 schools were moderately to highly satisfied, while teachers in nine schools expressed some dissatisfaction.

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*Scores ranged from .05 to .72 on a scale having a range of ± 1.0, with high ≥ .50, moderate = .30 to .49 and low ≤ .29.

Table III-3: Distribution of Scores on the Teacher Satisfaction Scale

Scale Score	Number of Schools
0 Low	3(12.5)
1	6(25.0)
2	6(25.0)
3	8(33.3)
4 High	1(4.2)
	24(100%)

Operational Definitions:

Scores were obtained by summing teachers' and principals' responses to interview items and teachers' responses to questionnaire items, which were coded as follows:

Interview Items

2 = All item responses for teacher and principal indicate satisfaction.

1 = All item responses for teachers or principal indicate satisfaction

0 = Teachers and principals do not indicate satisfaction on all item responses.

Questionnaire Items

2 ≥ .50

1 = .30 to .49

0 ≤ .29

Scores ranged from .05 to .72 on a scale having a range of ± 1.0, with high ≥ .50, moderate = .30 to .49, and low ≤ .29.

RELATIONAL ANALYSIS

As described in the previous section, variation in most, though not all, of the dimensions of organizational climate was substantial. This variation was examined for a relation to success in raising the reading and math achievement of students. Some of the data on policy development and long-range objectives concerned racial equality. Findings relating these aspects of organizational climate to equal educational opportunity have been reported in Chapter VII. Findings related to parent and community involvement have been reported in Chapter IV.

Each of the five major dimensions of organizational climate was examined in relation to student achievement. Results from these analyses yielded three convergent findings that suggest the importance of administrative leadership to school success in the in-depth study.

1. Schools where principals gave first priority to decisions about the selection of basic instructional materials succeeded in raising student achievement in math (C-8: $\phi = .48$, $\alpha = .02$), but not in reading.*

A related item, dealing with the degree of emphasis that principals assigned to long-range academic goals, was also examined in this context. It was found that an emphasis by principals on long-range academic goals was only slightly related to reading achievement and unrelated to math achievement. Thus, while the degree of emphasis placed on the selection of basic instructional materials were strongly related to math achievement, a similar emphasis on a conceptually related item, long-range academic goals, was unrelated to achievement gain. These results may indicate that to value an action leading to a goal (i.e., selecting basic instructional materials) may be more important to school success than merely placing a high value on the goal itself (i.e., long-range academic goals). Perhaps the long-range goals of the school are too abstract to have a significant influence on achievement while the decision-making activity, being more behaviorally specific, provides a better index for judging the school's administrative orientation. In other words, how important are long-range academic goals if decisions leading to those goals are not emphasized by the administration?

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*First priority is defined as ranked first among the seven decision areas.

2. Schools where administrators assumed more responsibility for decisions in selecting basic instructional materials succeeded in raising student achievement in math (C-9: $\phi = .42$, $\alpha = .04$), but not in reading.*

Although judgments about the sharing of decision-making included two extremes--(1) that decisions are made with little or no input from teachers, and (2) that they are made with little or no assistance from administrators--only rarely did an individual teacher or principal report either extreme. Scores were distributed evenly through a narrow range. Thus, it is not possible to say that administrators assumed an identifiable and distinctly large amount of responsibility at schools in which achievement gains occurred. Furthermore, it is difficult to attribute the lack of achievement gains when teachers shared more in decisions to their poor judgment, or conversely, to believe that administrators were better at selecting instructional materials. Variability of scores may indicate greater or lesser involvement by administrators in the decision-making process rather than the exclusion of teachers. In schools where administrators were more responsible for choosing materials, it may be that a coordinated school-wide instructional approach was operating to enhance math achievement.

3. Teachers' accurate perception of administrators' instructional views was associated with achievement gains in math (C-10: $\phi = .40$, $\alpha = .05$), and, to a lesser extent in reading (C-10: $\phi = .22$, NS).**

It was found that an accurate perception by teachers of views held by the administration on non-instructional matters (such as long-range objectives), or an accurate knowledge of school activities and resources, was not associated with achievement gains. The instructional norms on which teacher perception was important concern teaching practices that are behaviorally specific. An accurate understanding of the administrator's views on these practices may be more relevant to implementing an instructional program than to comprehension of long-range objectives, which are nearly always behaviorally vague. Similarly, to be well informed on matters less directly concerned with instruction may have little effect on the instructional program.

The methods used by effective administrators to communicate their views remain unclear. Analysis showed that the accurate perception by teachers of the instructional norms espoused by the principal cannot be attributed to the sending of memoranda or directives regarding classroom practices; nor can it be attributed to discussions of goals and methods at faculty meetings, frequent classroom visits, or a combination of these and other channels.

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*More responsibility is defined as at or below the median (3.4) on a five-point scale.

**High accuracy is defined as perception of the principal's point of view on four or five of the five specific teaching practices presented.

A high level of communication in general--that is, sending many directives, visiting classrooms frequently, and so forth--was not associated with achievement. Nevertheless, it is presumed that for teachers to be aware of instructional norms, some form of communication is necessary and is effectively taking place.

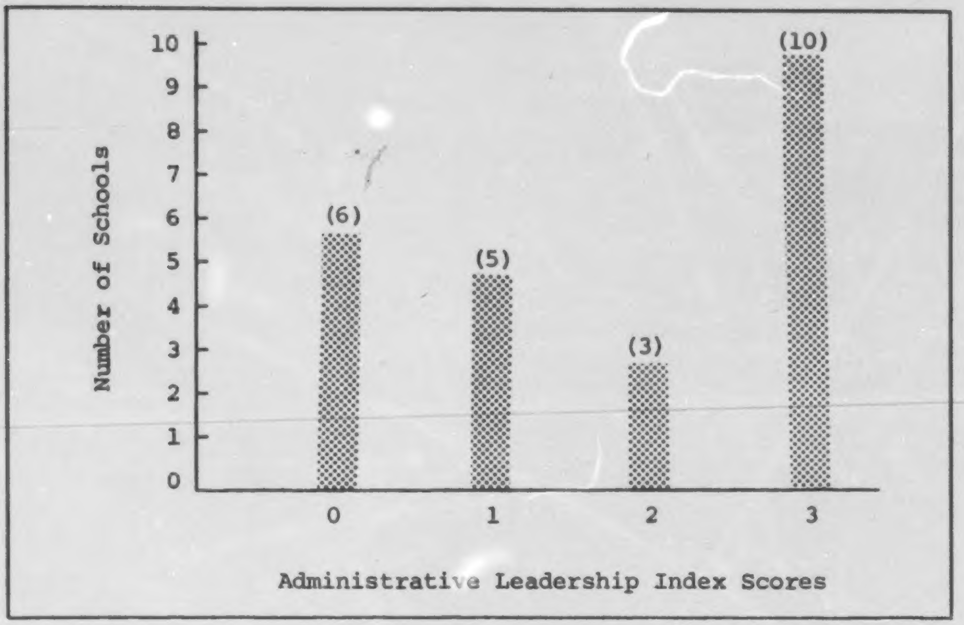
Not only were the above three variables related to math achievement, but they were also intercorrelated. More specifically, it was found that:

- Principals assumed greater responsibility for selecting basic instructional materials where they ranked this selection first in importance (C-11: $\phi = .34$, $\alpha = .10$).
- Where teachers accurately perceived the principal's instructional norms, principals assumed greater responsibility for selecting basic instructional materials (C-12: $\phi = .59$, $\alpha = .005$).
- Where a principal gave greatest priority to the selection of instructional materials, teachers accurately perceived the principal's instructional norms (C-13: $\phi = .48$, $\alpha = .02$).

The strong correlations among these key dimensions of an effective administration confirmed the usefulness of conceiving them as an integrated whole--as leadership. Leadership is an abstraction, but in the case of school administrators, one with tangible referents: responsibility, focus on instruction, and the ability to communicate that focus effectively.

A composite index of leadership was constructed using the three key dimensions described above. Index scores were obtained by summing code values assigned to each dimension. A value of 1 was assigned where principals gave first priority to decisions about the selection of basic instructional materials, where administrators assumed more responsibility for the selection of basic instructional materials, and where teachers correctly perceived four or five of the five instructional practices favored by the principal. Figure III-1 shows the distribution of these composite index scores.

Figure III-1: Distribution of Scores on the Administrative Leadership Index



As shown in Figure III-1, the distribution of scores formed a bimodal curve where 11 of the 24 schools scored low (0 or 1) and 10 of the schools scored high (3). In view of the strong inter-item associations, the bimodal distribution was expected. The bimodal curve is graphic evidence of the integral nature of leadership; in only three out of 24 elementary schools did administrators appear to be uncertain leaders (scale score = 2).

As shown in Table III-4, a crosstabulation of these leadership scores with achievement provided the following finding:

4. Administrative leadership in instruction was strongly associated with success in raising academic achievement.

The relation of administrative leadership in instruction with math gains was very strong ($\phi = .49$, $\alpha \leq .02$), and the relationship with reading gains was worth noting ($\phi = .28$, $\overline{NS}$).

Table III-4: Crosstabulation of Administrative Leadership Index by Achievement Gain

Administrative Leadership Index Scores by **Math Achievement Gain**

	High	Low	
High	11(84.6)	2(15.4)	13(54.2)
Low	3(27.3)	8(72.7)	11(45.8)
	14(58.3)	10(41.6)	24(100%)

$\phi = .49 \quad \alpha \leq .02$

Administrative Leadership Index Scores by **Reading Achievement Gain**

	High	Low	
High	7(60.0)	6(40.0)	13(54.2)
Low	2(21.4)	9(78.6)	11(45.8)
	9(37.5)	15(62.5)	24(100%)

$\phi = .28$, NS

Operational Definitions:

1. Administrative Leadership Index

High = 2, 3 on three point scale

Low = 0, 1 on three point scale

2. Reading and math achievement gain 1974-1975

High = At least two of three grades tested showed improvement in national percentile ranks.

Low = At least two of three grades tested showed no improvement in national percentile ranks.

It was noted at the beginning of this chapter that five major dimensions of organizational climate were examined. The Administrative Leadership Scale consisted of items drawn from the areas of Policy Development (e.g., administrative participation in policy decisions) and Administrative Control (e.g., teachers' accuracy in perceiving principal's instructional norms). Teacher satisfaction was not found to be related to student achievement; however, this may have resulted from the fact that only small differences existed among the in-depth elementary schools regarding this dimension of organizational climate.

Similarly, examination of the long-range objectives of the school did not yield significant relationships with student achievement. The lack of findings in this area might also be attributable to insufficient variation, since the major goal orientation in the in-depth schools focused on psycho-emotional goals.

However, one additional finding did emerge from the area involving support for teachers. Achievement gains were more likely to occur in schools where there was greater district-level support for new teachers; that is, where teachers reported districts provided two or more of the 10 forms of support inquired about (C-14: $\phi = .49$, $\alpha \le .02$ for math; $\phi = .28$, NS for reading). This finding might suggest the significance of those forms of support most prevalent at the district level. Orientation courses, inservice training, and special documents on procedures and regulations were those most frequently offered by the district. The two most common district procedures, orientation courses and inservice training, were associated with math achievement gain, though neither as strongly as when combined with all other procedures.

SUMMARY

The general task undertaken in the study of organizational climate in the 24 in-depth schools was to identify the components of organizational climate that were related to student achievement. Three key findings suggest the importance of leadership in instruction. Gains in math achievement were more likely to occur in schools where:

- Administrators emphasized the importance of selecting basic instructional materials.
- Administrators assumed more responsibility for the selection of basic instructional materials.
- Administrators effectively communicated a point of view concerning teaching practices.

These findings were so clearly identified as essential to an effective organizational climate in the in-depth study schools, and were so strongly associated one with another, that they can be summarized as a single finding:

- Schools that were successful in raising math achievement were characterized by administrative leadership in instruction.

This same finding can be applied to reading achievement, as well as to math achievement, although the results were less striking.

CHAPTER IV

PARENT AND COMMUNITY INVOLVEMENT

Interest in the level of parent and community involvement with school is in part based on the belief that parental support enhances the effectiveness of the school in raising student achievement. Furthermore, it is believed that involvement may be increased by the kind and amount of promotional activity in which the school engages.

Three key questions have guided the in-depth analysis of parent and community involvement:

- How much have the schools attempted to involve parents by sponsoring parent-teacher meetings and other promotional activities?
- How much are parents involved with the school, and to what degree does the extent of involvement relate to the extent of schools' promotional activities?
- Are differences in parent involvement associated with differences in student achievement?

The results reported in this chapter bear on each of these questions. Analysis tables and other supporting material can be found in Appendix D. References to these tables are given parenthetically in the text, for example: (D-1: $\phi = .50$, $\alpha = .02$), where "D" indicates the section of the appendix and "1" the specific table within that appendix.

VARIABLE DEFINITION AND SOURCE, AND DESCRIPTIVE ANALYSES

PROMOTION OF PARENT AND COMMUNITY INVOLVEMENT

Efforts to involve parents and other community members in schools were assessed by several items from interviews with principals. These questions concerned administrative policy reflected in the school's efforts to promote parent involvement; measures of such efforts included (1) the frequency of parent-teacher association meetings, and (2) the numbers and kinds of activities conducted by the school. These activities were: notifying all parents of open house for visiting classes; sending home newsletters and other communications; holding pot-luck dinners; opening the school in the evenings for community discussions of civic interest; sponsoring guest speakers for evening forums; providing evening entertainment (e.g., films, plays, dance, music); and providing classes for parents.

An index combining the number and frequency of specific promotional activities was created by summing the affirmative responses to these activities in the following manner: affirmative responses to the first and second activity listed above received a score of 1, while a value of 2 was assigned to affirmative responses for the remaining five activities (which refer to promotional activities that are presumed to be more innovative). Each score was then weighted according to the frequency with which the school promoted each activity; if the activity occurred once a year it received a weight of 1, and if more than once a year it received a weight of 2. The Parent Promotion Index has a range of values extending from 0 to 24. As shown in Table IV-1, the in-depth study elementary schools scored the full range of values on the Promotion Index. In subsequent analyses, scores of 10 or higher are considered to be indicative of a relatively high level of promotional activity.

Table IV-1: Distribution of Scores on the Parent Promotion Index

Scores	Number of Schools
0-4	5(20.8)
5-9	6(25.0)
10-14	6(25.0)
15-19	5(20.8)
20-24	2 (8.3)
	24(100%)

A related form of promotional activity was assessed by asking the principal the number of parent-teacher meetings that are sponsored each year by the school. Considerable variability in the frequency of parent-teacher meetings was found, ranging from none to more than 20 such meetings per year. Ten of the 24 elementary schools held nine or more parent-teacher meetings per year, and at least five such meetings occurred in 19 schools. For comparative purposes, nine or more meetings per year is considered to be relatively high, while anything less than that is considered relatively low.

As one might expect, the frequency of school-sponsored parent-teacher meetings was found to be strongly associated with the Parent Promotion Index (D-1: $\phi = .50$, $\alpha \leq .02$).

In addition to questioning principals about the promotional activities just described, teachers and principals were asked how school-community interaction is handled as a policy decision area. Specifically, each respondent was asked how important this area was relative to six other areas of school policy, and to what extent teachers participate in this decision area.* The rank assigned by teachers in a school was determined by averaging the rank choices made by each of the teachers.

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*The specific policy decision areas investigated in the in-depth study are described in Chapter III.

Principals tended to place somewhat more importance on decisions affecting school-community interaction than did teachers, ranking it fourth in most of the schools; teachers in a plurality of schools ranked the area fifth or sixth. A greater or lesser emphasis by teachers in a school was not associated with a similar emphasis by the principal.

Teachers and principals clearly differed in their estimates of how much teachers contribute to decisions in this area. A comparison of teacher and principal estimates (based on a five point scale) is shown in Table IV-2.

Table IV-2: Participation in Decisions Concerning School-Community Interaction

Source of Estimate	Number of Schools		
	Administrators Make More Decisions (Range = 1.0-2.9)	Administrators and Teachers Share Equally in Decisions (Range = 3.0-3.9)	Teachers Make More Decisions (Range = 4.0-5.0)
Principal	3	6	15
Teachers	12	8	4

As can be seen in Table IV-2, nearly two-thirds of the principals viewed teacher participation as substantial. By contrast, teachers in most schools reported that administrators assumed a larger share of responsibility for decisions regarding school-community interaction.

PARENT AND COMMUNITY PARTICIPATION IN THE SCHOOL

To assess the extent of parent and community involvement, and to investigate the relationship between promotion and participation, the following items from interviews with principals and teachers were examined:

a. Whether most parents visit at least once a year.

b. Attendance at parent-teacher association meetings.

c. The capacities in which parents work at the school (e.g., clerk, teacher aide, volunteer, or member of the advisory committee).

d. The decision areas at school in which parents are involved (class curriculum, budget, or hiring and firing of teachers).

e. The number of homes teachers visit each month (for report card conferences, because the student is having difficulty, or for other reasons).

f. The ratio of parent classroom volunteers to total number of students observed.

g. Whether or not paid parent aides are in the classroom.

h. Whether parents visit the classroom at the teacher's request.

i. Whether parents visit the classroom on their own initiative.

Three types of parent participation were analysed from these items: participation that was perfunctory or passive, participation that involved interacting with teachers and administrators, and parent participation that took place in the classroom.

The measure of perfunctory or passive participation used items a and b listed above. Attendance at meetings, where only listening and looking may be expected, indicates no more than the presence of parents at school. Similarly, whether most parents visit at least once a year (principal and teacher judgment) indicates nothing about the kind of involvement, or the extent to which there is interaction between parents and school personnel.

The remaining items on parent participation, c through i above, contain elements of school promotion of parent involvement. For example, parents are involved in school if they are serving on an advisory committee or are employed as teacher aides, but contained within this kind of involvement is school promotion of parent involvement. Involvement of this type was presumed to be interactive in nature.

Items f through i above concern parents in the classroom--as volunteers, teacher aides and as visitors. The items concerning visits to the classroom provided information on who initiated the visit--parent or teacher--and the number of parents who visited.

Responses to individual items indicated that interactive participation occurred to a fairly large extent in a majority of the in-depth schools. Parents in 14 of the elementary schools worked in three or four of the four capacities that were examined (i.e., clerk, volunteer, paid aide, member of advisory council). In 20 of the 24 schools they worked in at least two capacities. Similarly, parents participated in at least two or three decision-making areas (i.e., curriculum, budget, staffing) in slightly more than half the schools, and in one or more of the decision areas in 18 schools. Paid parent aides were in at least one of the observed classrooms in 18 of the 24 elementary schools.

High involvement of a more perfunctory, passive type occurred in a minority of schools. In only eight elementary schools did at least two-thirds of the teachers claim that most parents visited at least once a year, whereas in 16 schools teachers claimed most parents did not visit that often. Attendance at parent-teacher meetings represented 11 percent or more of the student body in only nine schools.

The seven items indicating interactive participation displayed positive associations among all possible pairs of items. The inter-item associations included the following: the number of decision areas in which parents participated was positively associated with the number of paid parent aides (D-2: $\phi = .34$, $\alpha \leq .10$) and the number of capacities in which parents worked at school (D-3: $\phi = .33$, NS); the number of capacities in which parents worked at school was positively associated with the number of homes teachers visited (D-4: $\phi = .39$, $\alpha \leq .05$).

Two scales were created to assess the interactive type of parent involvement. The first scale measures interactive participation and uses all seven items dealing with parent-school interaction (Table IV-3). The second scale measures parent involvement in the classroom and uses the last four items (Figure IV-1).

RELATIONAL ANALYSES

Analysis of parent involvement centered on two main issues: whether certain activities of the in-depth schools were related to the level of parent participation, and whether parent involvement was related to academic success.

1. Parents were significantly more likely to participate in schools where teachers indicated that administrators assumed more responsibility for for policy decisions (D-5: $\phi = .34$, $\alpha = .09$).

This relation obtained for policy decisions in general and for two particular areas: (1) the area of selection of basic instructional materials (D-6: $\phi = .43$, $\alpha = .04$), and (2) the area of parent involvement (D-7: $\phi = .33$, NS).

There was also a tendency for those schools where administrators assume a greater share of the responsibility for decisions concerning school-community interaction (according to teachers) to engage in more promotional activities and to hold parent-teacher meetings more frequently ($\phi = .29$, NS for both relations).

2. Parent/community involvement in the school was unrelated to the frequency of the school's promotional activities and meetings.

3. Schools where parents were involved in the classroom were relatively more successful in raising academic achievement (Table IV-4).

Table IV-3: Distribution of Scores on the Parent-School Interaction Index

Scale Scores	Number of Schools
0-3 (low)	2 (8.3)
4-6	2 (8.3)
7-9	8(33.3)
10-12	7(29.2)
13-16 (high)	5(20.8)
	24(100%)

Operational Definitions:

Index was created by summing scores to the following items:

1. Number of capacities (out of four listed) in which parents worked at school. Scores were summed across each capacity, where:

   1 = Yes
   0 = No

2. Number of decision areas (out of three listed) in which parents were involved. Scores were summed across each decision area, where:

   1 = Yes
   0 = No

3. Number of homes teacher visits per month for each of three reasons (i.e., student difficulty, report card conferences, other reasons). Scores were summed across each reason, where:

   1 = visit at least one student's home per month
   0 = visit less than one student's home per month

4. Ratio of parent classroom volunteers to total number of students observed at school:

   1 = at least one parent volunteer per 25 students observed
   0 = less than one parent volunteer per 25 students observed

5. Does the school employ paid parent classroom aides:

   1 = Yes
   0 = No

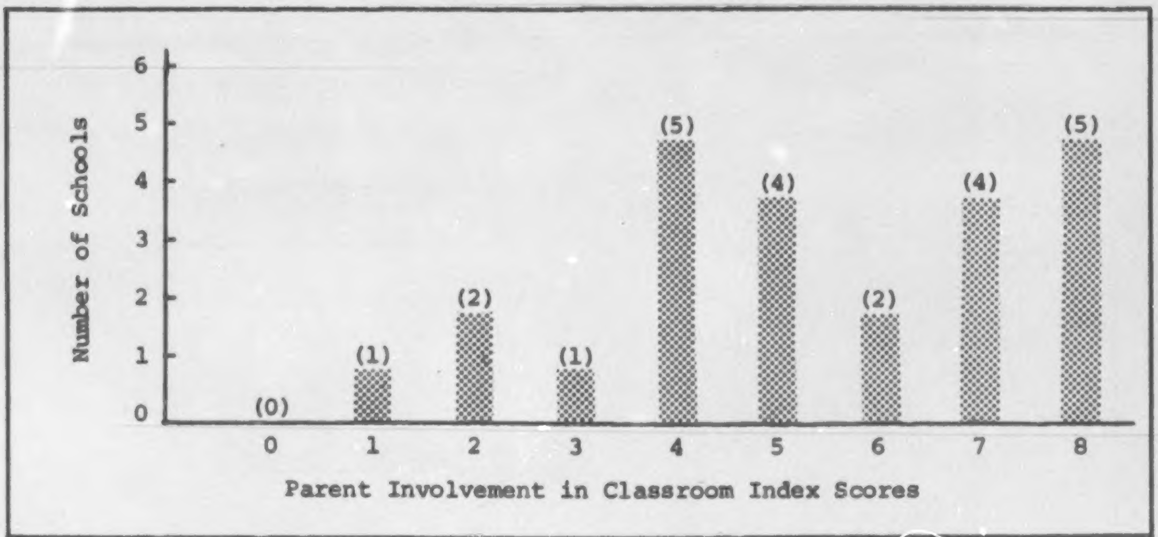
6. Do parents visit the classroom at teacher's request:

   2 = Yes, two or more parents visit per month
   1 = Yes, once per month
   0 = No, less than once per month

7. Do parents visit the classroom at their own initiative:

   2 = Yes, two or more parents visit per month
   1 = Yes, one parent visits per month
   0 = No, parents do not visit on own initiative

Figure IV-1: Distribution of Scores on the Parent Involvement in Classroom Index



Operational Definitions:

Index was created by summing scores to the following items:

1. Ratio of parent classroom volunteers to total number of students observed at school:

   2 = at least one parent volunteer per 25 students observed
   0 = less than one parent volunteer per 25 students observed

2. Does the school employ paid parent classroom aides:

   2 = Yes
   0 = No

3. Do parents visit the classroom at teacher's request:

   2 = Yes, two or more at least once per month
   1 = Yes, once per month
   0 = No, less than once per month

4. Do parents visit the classroom at their own initiative:

   2 = Yes, two or more parents visit per month
   1 = Yes, one parent visits per month
   0 - No, parents do not visit on own initiative

Table IV-4: Crosstabulation of Parent Involvement in the Classroom Index by Achievement Gain

		Math Achievement		
		High	Low	
Parent Involvement in the Classroom	High	9(81.8)	2(18.2)	11(45.8)
	Low	5(38.5)	8(61.5)	13(54.2)
		14(58.3)	10(41.7)	24(100%)

$\phi = .44,\ \alpha \leq .04$

		Reading Achievement		
		High	Low	
Parent Involvement in the Classroom	High	6(54.5)	5(45.5)	11(45.8)
	Low	3(23.1)	10(76.9)	13(54.2)
		9(37.5)	15(62.5)	24(100%)

$\phi = .32$, NS

Operational Definitions:

1. Parent Involvement in the Classroom (see Figure IV-1).

   High = scale score: 6 to 8

   Low = scale score: 0 to 5

2. Math/Reading Achievement:

   High = 2 of 3 classes tested showed improvement in national percentile ranks.

   Low = 2 of 3 classes tested did not show improvement in national percentile ranks.

Schools where paid parent aides and parent volunteers worked in the classroom and where more parents visited the classroom more often, either at the request of the teacher or on their own initiative, were the schools that made gains in math achievement.

Of the items composing the measure of Parent Involvement in the Classroom, the use of paid parent aides in the classroom was most strongly associated with math achievement. When a subset measure was constructed that combined paid parent aides in the classroom with the two items concerning parent visits to the classroom, but without the item on parent volunteers (D-9), a stronger relation with math achievement was obtained (D-8: $\phi = .49$, $\alpha = .01$). Reading gains also tended to occur in schools scoring high on this measure (D-8: $\phi = .28$, NS).

Crosstabulations of achievement with measures of parent involvement that included *school-level* participation yielded no such associations. The finding is specific to parent involvement in the *classroom*.

Many schools have paid instructional aides who are not parents. In Chapter VI, hours-per-week are reported for instructional aides of all types. Some use of paid aides is found in at least half of the observed classes in about half of the elementary schools. However, the number of hours of paid instructional aides is inversely correlated with achievement. Achievement gains were more likely to occur in precisely those schools using paid aides the least number of hours. While this finding was surprising, it suggests that the (presumed) effect of paid *parent* aides in the classroom cannot be explained in terms of sheer manpower. Careful examination of the data revealed no inconsistencies; in schools with no paid parent aides, the hour-per-week use of paid aides (non-parents) was high; and in schools with paid parent aides, the number of hours per week that they were employed was low.

Two features of the relation of parent involvement to achievement should be underlined: first, that involvement in the *classroom*, rather than in the school in general, is related to academic success; second, that *parent* involvement specifically, and not the use of instructional aides in general, is associated with school success in the in-depth study.

SUMMARY

Parent support and participation at school was related to student achievement. Successful schools were more likely to have parents in the classroom as aides, visitors, and as volunteers. It is not clear which particular promotional activities are most effective in raising or maintaining a high level of parent involvement in school, but it was found that administrative responsibility for school-community interaction was related to parent involvement.

CHAPTER V

READING AND MATH INSTRUCTIONAL PRACTICES AND TEACHER ATTITUDES

As noted in Chapter I, the analytic focus of the in-depth study was to concentrate on those aspects of a school program that are most amenable to policy intervention. Although virtually all facets of an educational program are influenced to some extent by school policy, the activities, procedures, and resources used to provide instruction seem particularly relevant to this research objective. A school's reading and math programs are largely under the direct control of school administrators and teachers; they are shaped by the allocation of school expenditures, and can be influenced by federal or state programs that provide financial or other forms of assistance to the school.

Much of the data collected in the in-depth study focused on policy-relevant characteristics of reading and math programs at the selected sites. Two general categories of variables were investigated: (1) the use of instructional techniques and practices, as well as teacher attitudes relevant to instruction; and (2) the use of instructional resources and their associated costs. This chapter reports the results obtained from the analysis of reading and math instructional practices and related teacher attitudes. Additional analysis tables and other supporting material are found in Appendix E. References to the tables are given parenthetically; for example (E-1: $\phi = .50$, $\alpha = .01$), where "E" indicates the appendix and "1" the specific table.

VARIABLE DEFINITION AND SOURCE, AND DESCRIPTIVE ANALYSIS

Teaching practices examined in the in-depth study included the following:

- Use of lesson plans and instructional objectives
- Amount of practice and guidance provided to students
- Use of instructional feedback, including positive and negative reinforcement
- Size of instructional groups, and the extent to which instruction was individualized
- Student discipline techniques

These practices were examined in two ways: (1) through teachers' instructional techniques, by observation, and (2) through teachers' instructional philosophy, by means of a self-administered questionnaire and interview items.

Teacher attitudes that were considered important included teacher expectations regarding student achievement and teacher perceptions of their own role and responsibility in student learning.

TEACHER PRACTICES AND INSTRUCTIONAL PHILOSOPHY

Use of Lesson Plans and Instructional Objectives

Teachers were asked about their use of instructional objectives and how much importance they placed on objectives, in a number of different contexts. In addition, the frequency and manner in which they used objectives during instruction were observed. Specifically, observers noted whether objectives were:

a. Included in written lesson plans.

b. Interrelated in the lesson plans.

c. Stated orally during instruction.

Table V-1 reports the number of schools observed using instructional objectives in these different contexts.

As is shown in Table V-1, considerable variability was obtained among the in-depth schools regarding their use of instructional objectives. For example, in approximately half the schools, instructional objectives were included in written reading or math lesson plans, and were judged to be interrelated in nearly the same proportion of schools. However, very few schools had teachers who consistently stated these objectives aloud to the students.

In addition to classroom observations regarding the use of instructional objectives, teachers completed questionnaire and interview items that asked about:

a. The importance of using behavioral objectives.

b. Whether the teacher had records that listed specific instructional objectives and showed the number of students who had attained them.

c. The importance of revising lesson plans when students have not attained instructional objectives.

Teachers' philosophy regarding the importance of using behavioral objectives was determined by presenting teachers with the following list of subject areas:

Table V-1. Number of Schools Observed Using Instructional Objectives During Reading and Math Instruction

Observer Judgment of Instructional Objectives	Number of Schools	
	Yes	No
Objectives were included in written lesson plans for:		
Reading	13(54.2)	11(45.8)
Math	12(50.0)	12(50.0)
Reading and Math	9(37.5)	15(62.5)
Objectives in written lesson plans were judged interrelated for:		
Reading	12(50.0)	12(50.0)
Math	10(41.7)	14(58.3)
Reading and Math	8(33.3)	16(66.6)
Teachers stated objectives aloud prior to instruction for:		
Reading	7(29.2)	17(70.8)
Math	3(12.5)	21(87.5)
Reading and Math	2(8.3)	22(91.7)

reading, social studies, math, art, and physical education. Teachers were then asked to rate (on a five-point scale) whether behaviorally-indexed objectives were important in their lesson plans for each of these instructional areas. Scores were then summed and averaged to provide a school-level index with a possible range of scores of ±1.0.

Inspection of the marginal distributions indicated that 10 schools placed somewhat greater relative emphasis on the importance of behaviorally-specific instructional objectives (scale score = .40 to .68), while two schools discounted their importance to instruction (scale score = .05 and -.13). The remaining 12 schools fell within the middle range, possibly indicating a slight-to-moderate endorsement of behavioral objectives (scale score = .18 to .36).

Teachers were also asked whether they maintained student records that listed specific instructional objectives and the number of students who had attained them. Teachers consistently reported such records for reading in 11 elementary schools, and for math in 10 schools.

The final item, drawn from the questionnaire, asked teachers to rate each of the following methods for handling instructional objectives that prove difficult for students: "repeating the lesson," and "using alternative teaching techniques (e.g., audiovisual equipment, games, puzzles, etc.)." All ratings were based on a five-point scale ranging from most important to least important. To assess teachers' flexibility in revising lesson plans, an index was created by averaging the scores assigned to "repeating the lesson" and "changing or eliminating the objective," and subtracting this value from the corresponding value placed on "revising the lesson plan" and "using alternative teaching techniques."

Although the resulting index had a possible range of values of ±1.0, no school scored at either end of the continuum. Fourteen of the 24 schools fell within the narrow range of .30 to .42, suggesting slight to moderate teacher flexibility in revising lesson plans. The remaining 10 schools fell within the range of -.11 to .29 and were scored low.

Several interesting interrelationships among these items also were found in the analysis. For example, in schools where reading records were maintained in terms of specific instructional objectives, teachers were more likely to have interrelated objectives in lesson plans (E-1: $\phi = .50$, $\alpha = .01$), and more likely to believe in the importance of behavioral objectives (E-2: $\phi = .33$, $\alpha = .10$). Similarly, keeping records of students' attainment of instructional objectives was associated with a greater emphasis on revising lesson plans when students failed to attain objectives (E-3: $\phi = .33$, NS for reading records; $\phi = .40$; $\alpha \leq .05$ for math records). These associated items were combined into a composite index assessing the use of instructional objectives. Table V-2 reports the scoring techniques and marginal distributions for this scale.

Table V-2: Distribution of Scores on Use of Instructional Objectives Index

Scale Scores	Number of Schools	
	Reading	Math
0 (low)	6(25.0)	6(25.0)
1	6(25.0)	7(29.2)
2	7(29.2)	6(25.0)
3 (high)	5(20.8)	5(20.8)
	24(100%)	24(100%)

Operational Definitions:

Scale was created by summing the scores to each of the following items:

1. Teachers maintain reading/math records showing students who have attained specific objectives:

    1 = Yes
    0 = No

2. Importance of revising lesson plans when objectives have not been attained

    1 = Greater importance
    0 - Lesser importance

3. Importance of using behavioral objectives:

    1 = Greater importance
    0 = Lesser importance

Amount of Practice and Guidance

Observers rated reading and math instruction for adequacy of practice periods. This included a four-point rating of whether the steps and the order in which they should be taken were indicated to the students. Practice during reading instruction was rated adequate (item score = 3 or 4) in 19 schools; during math instruction it was rated adequate in 18 schools. Where practice was adequate in reading, it tended also to be adequate in math ($\phi = .30$, NS).

Observers also rated the amount of guidance provided by the teacher during practice periods for reading and math instruction. In some classrooms, students received little or no help; in others, students sought out the teacher or the teacher responded to students requesting help; in still others, the teacher circulated among the students to identify those who needed help. Nine elementary schools provided little guidance in reading; 10 schools provided little guidance in math. The amount of reading guidance correlated strongly with the amount of math guidance; thirteen schools were high in both subjects and eight schools were low in both ($\phi = .65$, $\alpha = .001$).

No relation was found between adequacy of practice and the amount of guidance available to students needing help.

Use of Instructional Feedback and Positive and Negative Reinforcement

Teachers were asked during the interview and through the self-administered questionnaire to indicate the kinds of instructional feedback they provided to students. Observers made similar judgments during their observation of classroom behavior. Two basic types of instructional feedback were examined. The first type involved providing students with task-oriented information regarding their specific strengths and weaknesses in reading and math. The second type of feedback involved providing students with generalized expressions of approval or disapproval. This classification of instructional feedback draws upon Bales' (1950) classic distinction between task-oriented interaction and socio-emotional (or psycho-emotional) interaction.

Three interview items were used to assess the amount of task-oriented feedback provided to students. Teachers were asked whether they provided students with (1) written feedback regarding specific strengths, (2) written feedback regarding specific weaknesses, and (3) oral feedback regarding specific strengths and weaknesses. These items were then combined into an index of task-oriented feedback. Schools scoring high on this index were those in which teachers consistently reported using all three forms of feedback; schools classified as moderate had teachers who reported using two of the three methods; while schools scoring low were characterized by teachers who consistently reported using none or only one of the listed methods. Using these definitions of task-oriented feedback, 16 schools were classified as high--indicating that they provided many opportunities for this type of instructional feedback; five schools were scored moderate, and three schools were scored low.

Data regarding positive and negative reinforcement that was more psycho-emotional in orientation were derived from observations of classroom behavior. Observers recorded the number of times the teacher praised and complimented students, made positive contact with students, and granted privileges. Observations were also made regarding the frequency with which teachers criticized, scolded, or limited the activities of students.

The percentage of observed reinforcement that was positive ranged from 50 percent to nearly 100 percent. A larger proportion of positive reinforcement generally was associated with a larger absolute amount as well, since the amount of negative reinforcement varied little from school to school. In 12 schools, 80 percent or more of all observed reinforcement was rated positive.

Using a four-point scale, observers also rated the extent to which teachers used praise and pointed out students as positive role models during instruction. Teachers were observed using praise frequently in 10 schools, and pointing out individual students as positive models in 12 schools (item score = 3 or 4).

Size of Instructional Group and Extent to Which Instruction Is Individualized

Observers rated the frequency with which teachers directed instruction to individuals, small groups, or the whole class, using a rating criteria of most often, sometimes, or never. The number of elementary schools observed using the whole class, small groups, or individual students as the most frequent instructional group is shown in Table V-3. In very few schools were either small groups or individualized instruction the most frequent grouping procedure. In 18 of the 24 schools, the entire class was the most frequent grouping or was as frequent as the other two groupings.

Table V-3: Size of Instructional Groups
Used by Schools

Most Frequent Grouping Procedure	Number of Schools
Whole Class	9(37.5)
Small Groups	5(20.8)
Individual Students	1(4.2)
Mixed*	9(37.5)
	24(100%)

*"Mixed" includes each of the three methods of instruction with approximately the same frequency.

Student Discipline

Teachers were asked to rate (on a five-point scale) the following methods for controlling students who cause problems in the classroom: isolating the student, using physical punishment, providing alternate activity, changing stutent's seat, and sending student to higher authority. In the analysis, these disciplinary techniques were grouped into two categories. The first category consisted of those disciplinary measures that either removed the student from the activity of instruction (i.e., sending student to higher authority or isolating student) or implied a relatively more severe disciplinary response by the teacher (i.e., physical punishment). The second category consisted of those techniques that maintained the continuity of the student's instruction (i e., changing student's seat and providing alternative activity).

An index was created to describe teachers' assessment of the relative importance of student disciplinary methods. The Student Discipline Index was calculated by summing the scores for each of the more severe disciplinary techniques, and subtracting this figure from the corresponding value calculated for the less severe methods. Scores were then standardized so that the range of values extended from ±1.0, where a positive number indicated that the teacher attached more importance to the less severe methods and a negative score indicated that the teacher attached more importance to the more severe methods.

The Student Discipline Index was found to have a nearly continuous distribution on the positive side, extending from .04 to .53, indicating that in all of the in-depth elementary schools, teachers attached more importance to less severe disciplinary methods. To permit comparative analysis, the index was dichotomized at the median (scale score = .28).

ATTITUDES TOWARD STUDENTS AND TEACHING

Several attitudes related to teaching were investigated in the in-depth study. However, most of the attitudinal measures did not yield sufficient variability to permit comparative analysis. For example, teachers were asked about student personality both in regard to their preferences and which qualities they believed characterized better learners. Teachers in all schools felt that involved, motivated, creative, and intelligent children were likely to perform better than obedient, attentive, neat, and honest ones, and expressed a personal preference for children of a very similar description in all but three schools.

Teachers were also asked which of the following were more likely to promote academic achievement: family support, student effort, student ability, easy tasks that guarantee success, race or ethnicity of the student, sex of the student, or luck. Of those listed, effort and ability were consistently rated more important by teachers in all sample schools.

Two attitudinal scales did yield sufficient variability among the schools to permit closer examination. The first scale is a measure of teacher expectations regarding student performance; the second index assesses teachers' perceptions of their own role and responsibility in student learning.

Teacher Expectations

Two questionnaire items were used to assess teacher expectations. Teachers were asked to indicate on a five-point scale whether they expected their students to obtain a high school diploma, and to read and solve math problems at grade level or above. Average scores were calculated for each school by summing across all teacher responses and dividing by the number of teachers. Although the range of scores possible for these two items extended from +2.0 to -2.0, the obtained distribution of scores actually ranged from 2.0 to 0 where a higher score indicated higher teacher expectations. However, variability in teacher expectations was present among the in-depth elementary schools: the 16 highest-ranked schools on the item referring to high school diplomas were distinctly grouped at one end of the continuum (scale score = 2.0 to 1.0), and were therefore classified as having relatively high teacher expectations. The remaining schools were classified as low (scale scores = .83 to 0).

A similar grouping of schools existed for the item dealing with grade-level achievement: fifteen schools were classified as relatively high in teacher expectations (scale score = 2.0 to 1.0) and nine schools were classified as low (scale score = .83 to 0).

Teacher Estimates of Their Own Role and Responsibility in Student Learning

Teachers were asked two questions regarding their role and responsibility in student learning. In the first question, teachers used a five-point scale to rate the importance of competent teachers as a determinant of academic achievement, relative to student motivation. This scale had a range of values extending from +2.0 to -2.0, where a positive score indicated more teacher responsibility for student learning (relative to student motivation) and a negative score indicated less teacher responsibility.

In two schools, teachers appeared to reject clearly their own role in instruction (scale score = -.83 and -.75); in eight schools, competent teachers were considered about as important as motivated students (scale score = ± .10); and in another two schools, teachers thought their own competency had only slightly more impact than motivated students (scale score = .16 to .25). In the remaining 12 schools, teachers claimed a somewhat higher degree of responsibility for student learning relative to well-motivated students (scale score = .32 to .83). However, at no school did teachers believe that competent teaching was of such great importance that it overshadowed student motivation (scale score = 1.0 to 2.0).

The second question asked teachers to rate the following factors on a five-point scale according to how much they contribute to academic failure: low income; family problems; inadequate ability of student; lack of student motivation; inadequate materials; and inadequate teachers.

The importance attached to "inadequate teachers" was then compared to the average importance attributed to all of the other factors combined. This scale ranged from +1.0 to -1.0, where a positive score indicated that more importance was attached to inadequate teachers, and a negative score indicated less importance.

Teachers in 10 schools believed that inadequate teachers were about as important as the other factors in contributing to academic failure (scale score = ±.10). In the remaining 14 schools, teachers considered their own role somewhat less important (scale score = -.14 to -.47). There were no schools in the in-depth study in which teachers believed inadequate teaching was considerably more or less important than the other factors listed above.

RELATIONAL ANALYSIS

As described in the previous section, the use of instructional practices varied more in the in-depth schools than teachers' beliefs and attitudes regarding these practices. Practices and beliefs that did show sufficient variation were examined for their relationship to reading and math achievement. The findings are presented in this section.

Instructional practices concerning the size of the instructional group or the amount of individualized instruction did not appear to be related to achievement; nor was achievement related to the provision of instructional guidance. With regard to teacher attitudes, neither the importance teachers attached to their own role and responsibility in student learning, nor their expectations for student achievement were found to be significantly related to reading or math achievement.

The practices and beliefs that did show a relationship to achievement were involved with the following instructional variables:

- Objectives
- Practice
- Feedback
- Reinforcement

Six findings resulted from the investigation of these variables. The findings are listed below under the appropriate major headings.

INSTRUCTIONAL OBJECTIVES

A composite index of the Use of Instructional Objectives was created for both reading and math instruction. This scale was created by summing the responses to each of the following items:

a. Teachers maintained reading/math records showing whether students had attained specific objectives.

b. When objectives were not attained, teachers believed it was more important to revise lesson plans than to abandon the objectives or repeat the lesson unchanged.

c. Teachers valued the use of behavioral objectives in different subject areas.

The relation of this index to achievement gain was found to be statistically significant for both reading and math:

1. Schools in which teachers made greater use of instructional objectives for reading were more likely to show gains in reading (E-4: $\phi = .52$, $\alpha < .01$).

2. Schools in which teachers made greater use of instructional objectives for math were more likely to show gains in math (E-4: $\phi = .52$, $\alpha < .01$).

The key item in this index was the use of student records that showed attainment of specific instructional objectives. This item was significantly related to achievement in both reading (E-5: $\phi = .41$, $\alpha \leq .04$) and math (E-5: $\phi = .46$, $\alpha \leq .03$). Although the other two items in this index were not significantly related to achievement gain, both were related to reading and math achievement in the same (i.e., positive) direction.

INSTRUCTIONAL PRACTICE

A related finding concerned the relationship between the provision of instructional practice and student achievement.

3. Schools in which practice sessions included many of the steps necessary for mastery of the lesson objective (observer judgment), and teachers informed students of the sequence of steps to be followed during practice, were more likely to show reading achievement gains than schools in which practice relevant to the instructional objectives was not as evident (E-6: $\phi = .46$, $\alpha < .03$).

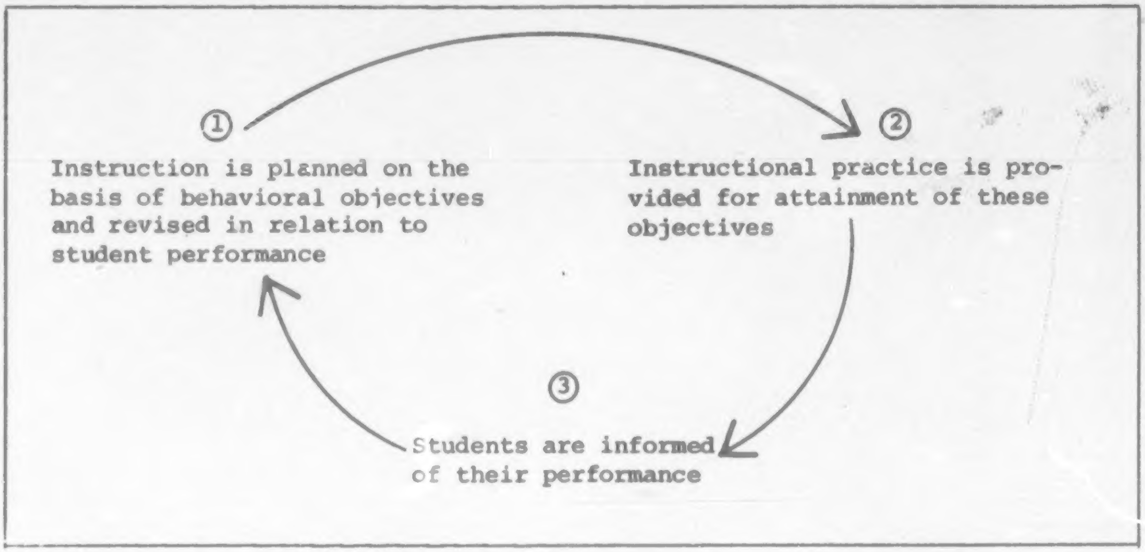
INSTRUCTIONAL FEEDBACK

A third dimension of reading and math instruction that was investigated involved the relationship between task-oriented instructional feedback and student achievement. There was a tendency for schools to show improved achievement when teachers reported that it was important to provide feedback regarding students' specific strengths and weaknesses (E-7: $\phi = .27$, NS for reading; $\phi = .21$, NS for math).

Instructional Objectives, Practice, and Feedback

Up to this point the relationships with student achievement have focused on three separate dimensions of reading and math instruction: using behavioral objectives during reading and math, providing instructional practice in relation to these objectives, and informing students of their attainment of these objectives. However, it might be more appropriate to consider these aspects of instruction within a larger conceptual framework. For example, instructional activity might be seen as a dynamic, on-going process in which instruction moves from the planning stage (i.e., lesson plans and instructional objectives), to instructional practice, to the provision of feedback, and back again to the planning stage, where lesson plans are revised on the basis of student performance. This hypothetical model of the instructional sequence is shown in Figure V-1.

Figure V-1: Three-Step Model of the Instructional Process


①
Instruction is planned on the basis of behavioral objectives and revised in relation to student performance
②
Instructional practice is provided for attainment of these objectives
③
Students are informed of their performance

Although the individual components in this sequence appeared to be related to student achievement (at various levels of statistical significance), they provided only a partial view of the instructional process when each was considered separately. Thus, the effect of providing instructional feedback on student achievement might have depended on the extent to which instructional practice was provided, or on the degree to which teachers maintained student records that showed objective-referenced task performance.

Conceiving of reading and math instruction in this way allowed us to test the following hypothesis:

> The more closely a school approximates the instructional sequence shown in Figure V-1, the more likely it will be to raise reading and math achievement.

To test this hypothesis, a combined measure of the instructional sequence was created by summing the scores for each of the individual items shown in Figure V-1. Table V-4 presents the distribution of scores and operational definitions for this index.

It can be seen from Table V-4 that the scores to the Instructional Process Index formed a continuous distribution, with a slight clustering of values at the high end of the continuum. To permit comparative analysis the scale was dichotomized at the midpoint: schools that scored 0, 1, and 2 were classified as being relatively low in approximating the proposed instructional model,

Table V-4: Distribution of Scores on the Instructional Process Index

Scale Scores	Number of Schools	
	Reading	Math
0 (low)	2(8.3)	2(8.3)
1	2(8.3)	2(8.3)
2	6(25.0)	5(20.8)
3	5(20.8)	8(33.3)
4	7(29.2)	5(20.8)
5 (high)	2(8.3)	2(8.3)
	24(100%)	24(100%)

Operational Definitions:

Scale was created by summing responses to the following items:

1. Teacher's rating of importance of behavioral objectives in different subject areas:

High = 1
Low = 0

2. Teachers maintained student records that showed attainment of instructional objectives:

Yes = 1
No = 0

3. Observer judgment that instructional practice included many of the steps necessary for mastery of lesson objective, and students were informed of the steps to be performed:

Yes = 1
No = 0

4. Teachers indicated that written and oral feedback on specific strengths and weaknesses was provided to students:

Yes = 1
No = 0

5. Teachers' rating of importance of revising lesson plans when objectives were not attained:

High = 1
Low = 0

while schools that scored 3, 4, and 5 were classified as relatively high. The crosstabulation of this index with reading and math achievement supported the hypothesis, as shown in Table V-5. Schools that were higher on the Instructional Process Index, as shown in Figure V-1, were significantly more likely to show gain in reading and math achievement.

INSTRUCTIONAL REINFORCEMENT

Data in the in-depth study did not detail the precise circumstances of teachers' use of praise, but it seems reasonable to suppose that teachers used praise to reinforce successful performance and/or to help the student develop a more positive self-image. However, in the in-depth study it was found that:

4. Schools where teachers were observed to praise students LESS frequently tended to raise student achievement in reading (E-8: $\phi = .39$, $\alpha = .05$).

5. Schools where teachers were NOT observed to point out students frequently as positive models tended to raise student achievement in reading (E-9: $\phi = .34$, $\alpha = .09$) and math ($\phi = .25$, NS).

When these two items were combined, the relationship with reading achievement was strong and statistically significant, and the relationship with math achievement was worth noting:

6. Schools in which teachers made LESS frequent use of praise and pointing out students as positive role models were significantly more likely to make gains in reading (E-10: $\phi = .48$ $\alpha < .02$) and tended to make gains in math (E-10: $\phi = .29$, NS).

Items pertaining to positive reinforcement were trichotomized to test for a curvilinear relationship with achievement (i.e., to determine whether a relatively moderate amount of positive reinforcement was associated with achievement gain, while a relatively low or high amount of positive reinforcement was unrelated or negatively related to achievement). No evidence was found to support this hypothesis; that is, as the level of positive reinforcement increased, the probability of school success in reading and math achievement decreased.

One possible interpretation of the inverse relationship between positive reinforcement and achievement gain is that teachers were using positive reinforcement in response to low achievement. For example, teachers may have provided psycho-emotional support when they believed that their students were unable to make academic progress in a more task-oriented environment. Thus, teachers may have temporarily de-emphasized instruction in basic skills, so

Table V-5: Crosstabulation of the Instructional Process Index by Achievement Gain

		Reading Achievement		
		High	Low	
Instructional Process Index	High	8(57.1)	6(42.9)	14(58.3)
	Low	1(10.0)	9(90.0)	10(41.7)
		9(37.5)	15(62.5)	24(100%)
		$\phi = .39$	$\alpha \leq .05$	

		Math Achievement		
		High	Low	
Instructional Process Index	High	12(80.0)	3(20.0)	15(62.5)
	Low	2(22.2)	7(77.8)	9(37.5)
		14(58.3)	10(41.7)	24(100%)
		$\phi = .48$	$\alpha \leq .02$	

Operational Definitions:

1. Instructional Process Index (see Table VI-4):

High = 3, 4, 5 on 5-point scale
Low = 0, 1, 2 on 5-point scale

2. Reading and math achievement gain:

High = At least two of three grades tested showed improvement in national percentile ranks.
Low = At least two of three grades tested showed no improvement in national percentile ranks.

that they could concentrate on improving students' self-image, which is often seen as a prerequisite to academic growth. This hypothesis was examined statistically in several different ways.

One such test involved correlating 1974 pretest scores and teacher expectations for student achievement with the use of positive reinforcement. The results indicated that teachers used more positive reinforcement when they reported lower expectations for their students. Teachers who consistently reported lower expectations for grade level achievement were more likely to use praise (E-11: $\phi = .31$, NS) and point out students as positive role models (E-11: $\phi = .34$, $\alpha = .09$). However, no relationship was found between 1974 pretest scores* and teachers' use of positive reinforcement.

A second test of the hypothesis was to investigate whether teachers who placed greater relative emphasis on psycho-emotional goals would be more likely to use praise and positive reinforcement. This would imply that greater use of positive reinforcement reflected a policy decision to concentrate on the psycho-emotional domain of the students.

As will be recalled from Chapter III, teachers were presented during the interview with 13 long-range objectives for the school and asked to pick and rank five in terms of their importance to school policy. Two of these goals were designated psycho-emotional (but were not identified to teachers in this way): (1) increasing students' motivation and desire to learn, and (2) improving the self-image of students.

In nearly all schools, psycho-emotional goals were more important than academic, social or institutional goals. Teachers picked the two psycho-emotional goals and ranked one first and the other second or third in 13 schools; teachers emphasized these two goals somewhat less in 11 schools. It was found that schools where teachers placed less emphasis on psycho-emotional goals tended to show gains in math achievement (E-12: $\phi = .35$, $\alpha = .08$). Of the 11 schools where emphasis was less, nine improved in math. A much smaller proportion, five out of thirteen, improved where greater emphasis was placed on psycho-emotional goals. No relation was found between the degree of emphasis on psycho-emotional goals and reading achievement. However, a greater emphasis on psycho-emotional goals was associated to a slight extent with frequent use of praise and pointing out students as positive models ($\phi = .24$, NS).

A third test of the hypothesis involved correlating the use of positive reinforcement with other aspects of reading and math instruction that were found to be significantly related to achievement gain. Thus, emphasis on providing positive reinforcement may imply de-emphasis of other instructional activities that were associated with academic improvement. Of the three major variables shown to be related to student achievement (i.e., the use of behavioral objectives, the provision of practice time, and the provision of instructional feedback), two were inversely related to positive reinforcement. That is, when teachers were observed providing more adequate practice, they also praised students less frequently (E-13: $\phi = .39$, $\alpha \leq .06$). Similarly, in schools where teachers used positive reinforcement less frequently, they were significantly more likely to stress the importance of providing students with feedback (E-14: $\phi = .44$, $\alpha \leq .03$).

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*Pretest scores were dichotomized (high/low) at the median.

It is also interesting to note that when teachers reported higher expectations for student achievement, they were more likely to attach greater importance to the use of behavioral objectives (E-15: $\phi = .33$, NS) and provide both adequate practice sessions and task oriented feedback (E-16: $\phi = .38$, $\alpha \leq .06$).

These data seem to suggest that the relationship between positive reinforcement and student achievement may be very complex. In particular, the use of positive reinforcement may impede academic growth by de-emphasizing a task-oriented approach to instruction (e.g., providing sufficient practice time or informing students of their weaknesses as well as their strengths). Furthermore, to have its intended effect, positive reinforcement should be used selectively, that is, only for those behaviors one wants repeated. Similarly, negative reinforcement should be directed towards only those behaviors one wants discontinued. As noted earlier, the amount of negative reinforcement used in the in-depth study schools was small and varied little. However, the amount of positive reinforcement varied considerably. Thus a higher percentage of positive reinforcement, in fact, indicates a greater absolute amount. Half the in-depth schools were observed using more than 80 percent positive reinforcement. It may be that 80 percent represents an absolute amount so large as to preclude selectivity. Schools scoring high in the use of positive reinforcement may have been using this technique excessively and to the detriment of their students.

SUMMARY

Reading and math instructional practices were investigated in the in-depth study through observation of classroom activities. Teachers' beliefs and attitudes concerning reading and math instruction were investigated by means of interviews with teachers of the observed classes, and through a self-administered teacher questionnaire.

As could be anticipated, more variation was observed in what teachers actually did in their classes than was found in teachers' attitudes and beliefs, as expressed in their interviews and questionnaires.

Instructional practices and beliefs measured by four variables showed a relationship to achievement. The first three of these variables--use of instructional objectives, providing students with a sequence of practice steps, and providing students with feedback on specific strengths and weaknesses--were used to compose an Instructional Process Index.

- Schools that were higher on the Instructional Process Index were significantly more likely to show gain in reading and math achievements.

Findings regarding the fourth variable--teachers' use of positive reinforcement--showed a strong inverse relationship with reading achievement and a weaker (not statistically significant) inverse relationship with math achievement. (Positive reinforcement in this analysis involved teachers' use of praise and pointing out some students as positive role models.) Further examination of these findings indicated the following:

- Teachers used more positive reinforcement when they reported lower expectations for their students and when 1974 pretest scores were relatively low.

- In those schools where teachers placed relatively less emphasis on psycho-emotional goals, students showed significantly more gain in math achievement.

- Teachers who were observed praising students less were also observed providing more practice time.

- Teachers who used less positive reinforcement were significantly more likely to feel that it was important to provide feedback to students on specific strengths and weaknesses.

CHAPTER VI

INSTRUCTIONAL RESOURCE USE AND RESOURCE COSTS

This chapter focuses on the resources used by schools to support reading and math programs for students in the ESAA sample, and on the costs associated with those resources. Specifically, the questions that guided the analysis reported below include:

- What were the major types of instructional resources used in providing reading and math services to students in the observed classes, and how were the resources utilized?

- Were there discernible patterns in the way resources were used among successful schools that set them apart from nonsuccessful schools?

- Were there systematic differences in resource costs associated with reading and math instruction in the successful and non-successful schools?

The methodological procedures used in this analysis are briefly discussed in the next section of this chapter, and data on the major resources used for reading and math instruction are presented. The discussion then shifts to the way in which successful and nonsuccessful schools typically allocated their respective resources and to the costs associated with allocation patterns. The chapter concludes with a discussion of the major findings. A more detailed account of the methodology used in the cost analysis can be found in Appendix B.

VARIABLE DEFINITION AND SOURCE, AND DESCRIPTIVE ANALYSIS

SOURCE OF DATA AND DEFINITIONS

The instructional resources of primary concern in this study are those that bear on the provision of reading and math instruction:

a. Teaching Staff--classroom teachers, reading specialists, math specialists, instructional aides, and resource teachers.

b. Support Staff--psychologists, counselors, speech therapists, principals, and librarians.

c. Equipment--tape recorders, record players, projectors, controlled readers, listening centers, and teaching machines.

d. Materials--self-instructional programs, non-text books, instructional games, and supplies.

e. Staff Development--reading inservice training and math inservice training.

Major emphasis was placed on measuring the actual use of each resource in reading or math instruction within the observed classrooms and not merely on measuring resource availability within a school. To collect resource-use data, two types of instruments were employed. The primary instrument was a self-administered questionnaire for teachers that included questions on the extent to which a teacher allocated time to reading and math instruction and used special instructional staff in the classroom. Teachers were also asked to provide information on their use of instructional equipment and materials, and on the amount of inservice training received in the past year. This source of information was supplemented by classroom observation protocols, completed by the in-depth interviewers, that provided data on classroom characteristics, resource facilities, and various instructional materials that were available and used in the classroom.

METHODOLOGICAL PROCEDURES

The resource-use data collected from each teacher of the observed classes were used for two different purposes. On the one hand, class-level data were aggregated to the school level and used to describe the frequencies with which different resources were allocated to reading or math instruction. On the other hand, the same resource-use data were used in conjunction with average resource prices to estimate the resource costs associated with the provision of reading and math in the observed classes. Each purpose entailed somewhat different methodological procedures. For the most part, specific resource-use variables were defined in terms of single item indicators. For analytic purposes, schools were normally ranked high, moderate, or low on each resource-use variable.

An Equipment Use Intensity Scale was designed to differentiate schools in terms of the frequency with which different types of instructional equipment were used for math or reading. A school was given a score of 1 for each type of equipment used on a frequent basis (i.e., at least one to two hours each week) by a majority of observed teachers. It was possible for a school to score from 0 to 9 on this scale, with a value of 9 indicating that a majority of teachers frequently used many different types of equipment in their classes. Actually, school values varied from 0 to 4. Schools were ranked high if two or more types of equipment were used frequently, and low if one or no type of equipment was used frequently. Fifteen elementary schools ranked high and eight ranked low on this scale; one elementary school did not provide usable data.

Different procedures were required to convert resource-use data into resource cost estimates. The purpose of this conversion was to obtain cost estimates for providing reading and math instruction to students in the observed classes and, in turn, to assess successful and nonsuccessful schools on the basis of their relative resource cost allocations.

Procedurally, each teacher's cost for teaching reading or math was calculated by multiplying the proportion of time spent in reading or math by the teacher's average annual salary. An annual average salary scale was calculated on the basis of actual salary data from districts participating in the in-depth study and included consideration of a teacher's formal education and experience. Once each teacher's reading and math resource costs were calculated, these costs were summed to determine the school's overall teacher costs for providing reading and math. A similar procedure was followed in calculating the costs of special instructional and non-instructional staff associated with the reading or math programs in the school.

Costs associated with using instructional equipment and materials were calculated on the basis of an average annualized capital and operating cost for each type of resource multiplied by the proportion of time each teacher used the resource in reading or math. For instructional supplies, a standardized cost was assigned to each student in a teacher's reading or math class.

A general estimate of reading and math inservice costs for classroom teachers was calculated by multiplying each teacher's hourly rate by the total hours of training received in the past year. While this procedure did not take into consideration all of the associated training costs, it was the best estimating procedure available for this study.

The procedures outlined above were used to develop reading and math program resource costs for the elementary schools in the in-depth study. In the following section, a descriptive analysis of major resource allocation patterns in the elementary schools is presented.

DESCRIPTIVE ANALYSIS OF READING AND MATH RESOURCE ALLOCATION

Instructional Group Setting

Eighteen of the 24 elementary schools in the in-depth study used standard-size classrooms, with either stationary or movable furniture, for regular class instruction. The remaining six schools typically had large rooms that provided an open learning environment or were partitioned into several smaller instructional areas. Fourteen of the schools provided special-purpose areas within the classrooms for audiovisual equipment use, painting, or small-group storytelling activities; the remaining 10 schools provided such areas outside the classroom, usually in a resource center. About half of the schools provided pullout remedial reading or math classes, which were often held in resource or learning centers.

Among the study schools, average class size ranged from 18 to 34 students, as indicated by Table VI-1.

Table VI-1: Distribution of Average Class Size Within Schools

Class Size	Number of Schools
18-21 students	3(12.5)
22-25 students	4(16.7)
26-29 students	6(25.0)
30-34 students	4(16.7)
No consensus*	7(29.1)
	24(100%)

Instructional Focus and Emphasis

Elementary schools were divided equally between those with teachers who spent an average of 21 to 26 hours each week in classroom instruction covering all subjects, and those having teachers who spent more than that amount, as the distribution in Table VI-2 shows.

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*Variation in class size within each of these schools was so great that the consensus rule could not be applied. See Chapter II for a discussion of the consensus rule.

Table VI-2: Teachers' Average Weekly Time Allocation to Instruction

Type of Instruction	Range of Averages	Number of Schools
All Types Combined	21-26 hours	12(50.0)
	27-35 hours	12(50.0)
		24(100%)
Formal Reading	4-5 hours	4(16.7)
	6-9 hours	12(50.0)
	10 hours and above	8(33.3)
		24(100%)
Reading-Related	3-4 hours	5(20.9)
	5 hours	11(45.8)
	6 hours and above	8(33.3)
		24(100%)
Formal Math	2-5 hours	19(79.2)
	6-9 hours	3(12.5)
	10 hours and above	2(8.3)
		24(100%)
Math-Related	0 hours	10(41.6)
	1-4 hours	12(50.0)
	5 hours	1(4.2)
	No consensus	1(4.2)
		24(100%)

The data in Table VI-2 also indicate that regular classroom teachers tended to spend more of their instructional time in formal reading and reading-related activities than in math activities.[*] For example, in 20 schools, teachers spent an average of six hours or more each week in formal reading, while in 19 schools, teachers devoted between two and five hours each week to formal math. Also, all of the elementary schools spent some time in reading-related instruction, whereas teachers in 10 schools devoted no additional time to math-related instruction.

Instructional Staff

With few exceptions, the elementary schools followed fairly conventional classroom teacher staffing practices; that is, regular classes were taught by one full-time classroom teacher, although instructional aides and remedial specialists were used in some cases. Only four elementary schools used a team-teaching approach.

All of the classroom teachers who participated in the study had earned at least a Bachelor's degree; in eight schools two or more of the observed teachers had Master's degrees.

In eight schools, most of the observed teachers had from one to five years of teaching experience; in four schools, most of them had from six to 10 years of experience; and in three schools, most of the teachers had between 11 and 18 years of teaching experience.[**]

Data on the use of special instructional and support staff are presented in Table VI-3. Nearly twice as many schools used reading specialists as used math specialists for one hour or more each week.

About half of the schools did not have instructional aides. Among the remaining schools, use of aides varied considerably, ranging from an average of two hours to an average of 21 hours each week. As might be expected, a majority of elementary schools did not make frequent use of speech therapists or school counselors in the observed classes.

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[*] Teachers were asked to estimate how much instructional time each week they devoted to reading-related and math-related instruction. Reading-related instruction refers to instruction whose primary focus might be history or social science, but in which the teacher attempts to present the lesson so as to improve or develop reading skills as well. Similarly, math-related instruction refers to the teaching of science so as to improve math skills also.

[**] The data for eight schools varied so widely that no central tendency was observed. One school did not provide data on this item.

Table VI-3: Average Weekly Use of Special Instructional and Support Staff

Type of Special Staff	Range of Averages	Number of Schools
Reading Specialists	0 hours	6(25.0)
	1-3 hours	5(20.8)
	4-7 hours	13(54.2)
		24(100%)
Math Specialists	0 hours	14(58.4)
	1-3 hours	2(8.3)
	4-6 hours	8(33.3)
		24(100%)
Instructional Aides	0 hours	11(45.8)
	1-5 hours	5(20.9)
	6-21 hours	8(33.3)
		24(100%)
School Counselors	0 hours	19(79.2)
	1-2 hours	3(12.5)
	3-4 hours	2(8.3)
		24(100%)
Speech Therapists	0 hours	15(62.5)
	1-2 hours	2(8.3)
	3-4 hours	7(29.2)
		24(100%)

Instructional Equipment and Materials Use

As noted earlier, most of the 24 elementary schools had either special-purpose areas within the classroom or resource centers that contained special instructional equipment. Three types of equipment were frequently used for instruction.* Eight schools made frequent use of tape recorders in instruction and 10 schools made frequent use of movie projectors. A majority of teachers in 16 schools typically used record players to assist in the instructional process. Schools that made frequent use of equipment tended to use two or more different types of equipment. For example, 15 of the 24 elementary schools demonstrated an intensive use** pattern with regard to a combination of tape recorders, record players, and movie projectors to supplement other resources in the classroom or learning center. Other types of equipment used infrequently, if at all, were slide projectors, overhead projectors, filmstrip projectors, and teaching machines.

A common form of supplementary materials was non-text books located in the classroom. Eighteen schools used these books at least once weekly. Other schools used them only one or two times monthly, if at all. Similar to the use of non-text books, 20 schools used instructional games or kits on at least a weekly basis, with the remaining schools making very limited use of them.

While a majority of schools made use of non-text books and instructional games or kits as supplementary resources, very limited use was made of math or reading programmed packages as either primary or supplementary materials. Only four schools used programmed packages; they were used in both reading and math.

Inservice Training for Classroom Teachers

Somewhat more emphasis was placed on providing inservice training in reading than on inservice training in math. Twelve schools provided an average of 10 hours or less of reading inservice training, while the remaining 11 schools provided an average of 14 to 35 hours of reading inservice training. Eighteen schools provided an average of 10 hours or less of math inservice training.***

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*Frequent use was defined as use of a type of equipment one or more times each week by a majority of observed teachers within a school.

**Intensive use was defined as use of two or more types of equipment on a frequent basis.

***Data were missing on one school.

A summary of resource-use in the in-depth elementary schools shows the following patterns:

a. A majority of schools provided regular instruction in standard-size classrooms that included special-purpose areas for individualized or small-group instruction. Nearly half of the schools had resource or learning centers for their students.

b. There was substantial variation in average class size among the schools. Half of the schools had an average class size of between 26 and 30 students, while most of the remaining schools averaged between 20 and 25 students per class. Average class size ranged from 18 to 34 students, with a median value of 26 students.

c. While teachers in 12 schools devoted an average of 21 to 26 hours to class instruction, teachers in the other 12 schools reported spending up to 35 hours in instruction each week.

d. Teachers devoted much more time to formal reading than to formal math instruction each week; many teachers spent twice as much time in reading as in math. A majority of teachers attempted to integrate the development of reading skills with lessons in other subjects, such as history or social sciences. Teachers were much less inclined to integrate the development of math skills with lessons in other subjects, such as science.

e. Although most schools used only one classroom teacher for each class, with only four schools following a team-teaching approach, the use of additional special instructional staff was fairly common. Eighteen schools used remedial reading specialists from two to six hours each week in the classes observed. Exposure to a remedial reading specialist tended to be in addition to regular class reading. About half of the schools did not have instructional aides, while the other half used aides from two hours each week (on the average) to over 20 hours. School counselors and speech therapists were not typically used in elementary schools.

f. Fifteen of the 24 elementary schools used instructional equipment intensively; that is, these schools used some combination of tape recorders, record players, and movie projectors at least twice each week to supplement other resources.

g. A majority of schools made extensive use of non-text books and instructional games. Programmed packages were not common primary or supplementary materials among the schools studied.

h All of the teachers had Bachelor's degrees, but few had Master's degrees. Teachers in half of the schools had from one to 10 years of teaching experience; teachers in the other schools either averaged between 11 and 18 years of experience or varied so much that an average would be misleading.

i. More emphasis was placed on reading inservice training for classtoom teachers than on math inservice training.

RELATIONAL ANALYSIS

In analyzing the ways in which schools allocated their resources, we were concerned with answering two questions:

- To what extent were resources allocated on the basis of need?
- To what extent was the resource allocation strategy effective in raising student achievement?

RELATIONSHIP OF NEED TO RESOURCE ALLOCATION

Schools were defined as "needy" or "less needy" on the basis of their combined reading and math 1973 pretest scores. The 12 lowest-ranked schools were identified as needy and the other 12 were identified as less needy.

To assess whether or not resources were differentially allocated in the needy and less needy schools, average per-pupil resource costs were calculated for each group of schools. T-tests were calculated to assess whether or not the observed differences between needy and less needy schools were significant at the .10 level. The results of our analysis, as presented in Table VI-4, are summarized below.

1. The needy schools had somewhat greater per-pupil resource costs for classroom teachers than the less needy ones.

On the average, classroom teachers in needy schools devoted more time to reading and math instruction, including lesson plan preparation, than teachers in the less needy schools.

2. The resource costs for remedial reading specialists were nearly twice as high in needy schools as they were in less needy schools, whereas the resource costs for remedial math specialists were eight times as great in needy schools.*

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*It should be noted that nine of the 12 schools classified as less needy did not use remedial math specialists at all. The average per-pupil cost of $6.48 is based on the use of math specialists in three schools only.

Table VI-4: Average Per-Pupil Resource Costs for Schools Ranked Low (Needy) and High (Less Needy) on 1973 Pretest Scores

Reading Resources	Average Per-Pupil Costs in Needy Schools (N = 12)	Average Per-Pupil Costs in Less Needy Schools (N = 12)
Classroom teachers[1]	$199.53	$185.40
Reading specialists	74.33	40.29*
Instructional aides	31.13	22.57
Classroom teachers' reading inservice training	6.72	4.40
Equipment use	.38	1.01
Materials use	7.09	8.58
Reading Totals:	$319.18	$262.25
Math Resources		
Classroom teachers[1]	$118.94	$111.68
Math specialists	57.59	6.48**
Instructional aides	14.23	10.70
Classroom teachers' math inservice training	3.84	2.85
Equipment use	.16	.27**
Materials use	2.96	3.90*
Math Totals:	$197.72	$135.88**
Combined Reading and Math Totals:	$516.90	$398.13*
Resources for Support Services		
Time classroom teachers devote to administrative work	$ 55.33	$ 87.84*
Counseling and testing for students[2]	12.85	22.57
Non-instructional staff support[3]	13.15	18.14
Principal's time in assisting classroom teachers[4]	10.96	10.07
Support Service Totals:	$ 92.29	$138.62**
Combined Totals for Reading, Math and Support Services:	$609.19	$536.75

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*Difference between the means is significant at the .10 level.

**Difference between the means is significant at the .05 level.

[1] This is a composite variable that includes the time teachers devote to instruction and lesson plan preparation (for reading or math).

[2] This includes the time school counselors or psychologists spent with the students in the ESAA samples.

[3] This includes the time social workers, librarians, speech therapists, and other support personnel devoted to the students in the ESAA samples.

[4] This cost pertains only to the time principals devoted to assisting teachers with specific instructional or classroom problems.

While the resource cost differences between the two types of schools were also reflected in the use of instructional aides, the differences were not as great as in the use of remedial specialists.

3. More inservice training for classroom teachers was reported in the needy schools.

For both reading and math, the needy schools allocated more of their teachers' time to inservice training than the less needy schools. Hence, the average per-pupil costs for both types of staff development activities were greater for the needy schools.* This difference provides additional evidence that the needy schools emphasized the use of instructional staff and provided them with frequent opportunities for improving their instructional skills.

4. For both reading and math instruction, the less needy schools had higher average per-pupil resource costs for equipment and materials and lower costs for instructional staff than the needy schools.

However, it should be noted that the less needy schools had higher resource costs associated with teachers performing administrative duties. The higher teacher resource costs associated with performing administrative duties probably account for some portion of the lower teacher resource costs for instructional staff in less needy schools.

Similarly, the less needy schools had higher resource costs associated with providing counseling and testing services to the observed students than the needy schools. The same pattern was seen in the use of social workers, librarians, and other non-instructional staff members. Quite consistently, the less needy schools allocated more non-instructional staff resources to the ESAA-sample students than the needy schools.

The data presented in Table VI-4 clearly suggest that the needy schools stressed instruction in basic skills and emphasized the use of remedial specialists, while the less needy schools placed less emphasis on the use of remedial specialists and more emphasis on equipment and materials use and on the provision of special support services such as counseling and testing.

RELATIONSHIP OF RESOURCE ALLOCATION TO ACHIEVEMENT

In the preceding section, findings were summarized concerning the relationship of need (based upon 1973 pretest scores) to the ways in which schools allocated their resources.

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*Staff development costs were determined by multiplying the time teachers were in reading or math inservice training activities by their hourly salary rates.

In this section we are concerned with examining the relationship of resource allocation to reading and math achievement based upon 1974-1975 achievement gain scores. In the identification of successful and nonsuccessful schools, as described in Chaper II, nine schools were classified as successful and 15 were classified as nonsuccessful in reading, and 14 schools were classified as successful in math while the remaining 10 were classified as nonsuccessful in math. These groups of schools were examined in relation to differences in instructional costs.

Tables VI-5, VI-6, and VI-7 present the average per-pupil costs associated with each type of instructional resource used by the successful and the nonsuccessful elementary schools. T-tests were calculated to assess whether or not the observed differences between successful and nonsuccessful schools were significant at the .10 level. The findings are summarized below.

Table VI-5: Average Per-Pupil Reading Resource Costs for Schools Ranked Successful and Nonsuccessful on Reading Achievement Gains[1]

Reading Resources	Average Per-Pupil Costs in Successful Schools	Average Per-Pupil Costs in Nonsuccessful Schools
	(N = 9)	(N = 15)
Classroom teachers[2]	$187.81	$195.25
Reading Specialists	76.58	46.54
Instructional aides	25.84	28.26
Classroom teachers' reading inservice training	4.48	6.20
Equipment use	.37	.90
Materials use	6.73	8.50*
Totals: --------	$301.81	$285.65

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*Difference between the means is significant at the .10 level.

[1] The rankings were based on reading national percentile change scores for 1974-1975.

[2] This is a composite variable that includes the time teachers devoted to instruction and lesson plan preparation in reading.

Table VI-6: Average Per-Pupil Math Resource Costs for Schools Ranked Successful and Nonsuccessful on Math Achievement Gains[1]

Math Resources	Average Per-Pupil Costs in Successful Schools (N = 14)	Average Per-Pupil Costs in Nonsuccessful Schools (N = 10)
Classroom teachers[2]	$114.13	$116.95
Math specialists	42.79	12.30*
Instructional aides	9.98	15.44**
Classroom teachers' math inservice training	2.72	4.22
Equipment use	.14	.28
Materials use	3.30	3.62
Totals: -------	$173.06	$152.81

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*Difference between the means is significant at the .10 level.

**Difference between the means is significant at the .05 level.

[1] The rankings were based on math national percentile change scores for 1974-1975.

[2] This is a composite variable that includes the time teachers devoted to instruction and lesson plan preparation in math.

Table VI-7: Average Per-Pupil Support Service Resource Costs for Schools Ranked Successful and Nonsuccessful on Combined Reading and Math Achievement Gains[1]

Resources for Support Services	Average Per-Pupil Costs in Successful Schools (N = 9)	Average Per-Pupil Costs in Nonsuccessful Schools (N = 15)
Time classroom teachers devote to administrative work	$ 71.59	$ 71.58
Counseling and testing for students[2]	15.86	18.82
Non-instructional staff support[3]	15.86	15.51
Principal's time in assisting classroom teachers[4]	8.70	11.60
Totals: -------	$112.01	$117.51

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[1] The rankings were based on combined reading and math national percentile change scores for 1974-1975.

[2] This includes the time school counselors or psychologists spent with ESAA-eligible students.

[3] This includes the time social workers, speech therapists, and other support personnel devoted to ESAA-eligible students.

[4] This cost pertains only to the time principals devoted to assisting teachers with specific instructional or classroom problems.

1. The successful schools tended to have higher resource costs in their reading and math programs for students than the nonsuccessful schools.

The successful schools had an average per-pupil cost of nearly $302 in reading and approximately $173 in math. Comparable figures for the nonsuccessful schools are $286 and $153, respectively. In both successful and nonsuccessful schools, more resources were allocated to reading than to math. The successful and nonsuccessful schools were about equal in their relative emphasis on reading and math: the successful schools' average per-pupil reading resource costs represented about 64 percent of their average combined reading and math resource costs, whereas the nonsuccessful schools' reading resource costs represented 65 percent of their combined resource costs. None of the comparisons were statistically significant.

2. Substantially more resource cost for math remedial specialists was significantly related to math gain.

The successful schools reported over three times more resource costs for remedial math specialists than the nonsuccessful schools, as the data in Table VI-6 indicate. A much higher average per-pupil resource cost for remedial reading specialists was associated with reading gain, although not significantly. The importance of these results is amplified by the fact that the schools that were the most academically needy in 1973 (when ESAA funding began), and allocated a substantial amount of remedial specialists' time to ESAA-sample students, tended to be the most successful in terms of math gain scores. Nine of the 12 needy schools in 1973 were successful in math in 1975; only five of the 12 less needy schools became successful in math. These results suggest that schools that emphasized the use of remedial specialists benefited more than schools that made different allocation decisions.

3. The allocation of other resources was higher in the nonsuccessful schools.

Higher average per-pupil resource costs for teacher inservice training, instructional aides, and equipment and materials occurred in the nonsuccessful schools. The significantly higher per-pupil costs for instructional aides in the nonsuccessful schools is consistent with the inverse relationship between the use of paid aides and achievement reported in Chapter IV. Indeed, the mere employment of instructional aides in the classroom did not contribute to achievement. What did seem to contribute to school gains was the use of paid parent aides in the classroom.

The nonsuccessful schools, for the most part, also had slightly higher average per-pupil resource costs for support services, such as counseling and testing.

SUMMARY

This chapter focused on two areas: the allocation of resources in schools classified as needy and less needy (based upon 1973 pretest ranking), and the relationship of resource allocation to success (based upon 1974-1975 achievement gain scores). Our findings indicate that the successful schools had somewhat higher per-pupil resource costs for reading and math than the nonsuccessful schools. This difference, in large measure, was due to the successful schools' greater emphasis on using remedial specialists in math and reading. The nonsuccessful schools tended to emphasize, more than did the successful ones, the use of instructional aides, classroom teacher time in reading, teacher inservice training, and use of equipment and materials. The benefits from these allocation decisions seemed to have been more limited than the successful schools' benefits from using remedial specialists in math, and, to a lesser extent, in reading.

CHAPTER VII

EQUALITY OF EDUCATIONAL OPPORTUNITY

One of the objectives of the act authorizing the ESAA Grants Program is to identify "...the needs incident to the elimination of minority-group segregation and discrimination...." This key objective has made equality of educational opportunity (EEO) an important outcome measure in the evaluation of the Emergency School Aid Act. This chapter reports the results obtained from an in-depth look at EEO. Additional tables and other supporting material can be found in Appendix F. References to the tables are given parenthetically in the text of this chapter; for example, (F-1: $\alpha = .07$), where "F" indicates the section of the appendix and "1" the specific table.

The minority student population in the in-depth study schools was almost entirely Black. However, these schools varied in their racial composition and in their desegregation history. Some of the schools were in districts that had been awarded Basic ESAA grants and had desegregated, were in the process of desegregation, or were planning for desegregation; certain other schools, in districts that received Pilot ESAA grants, were not desegregating. Table VII-1 reports the racial composition of the schools selected for in-depth study.

As shown in Table VII-1, all of the secondary schools contained a very large proportion of majority students, while 19 of the 24 elementary schools contained large proportions of minority students. Most of the EEO analysis that follows is based on observational measures that compared the treatment accorded to majority and minority students and examined relations between different racial/ethnic groups. Consequently, the results reported in this chapter focus on the 16 elementary schools in which fewer than 90 percent of the students were of a single racial/ethnic group (i.e., schools in which differential treatment and some intergroup interactions was possible).

Several different kinds of school behavior were examined in the in-depth study to assess the extent to which majority and minority students were afforded equality of educational opportunity in desegregated elementary schools. In this chapter, results of the analysis of the following five dimensions of EEO are described:

- Equality of educational practices
- Student integration
- Student perceptions of equal educational opportunity
- Teachers' and principals' perceptions of EEO policy
- Racial and ethnic representativeness of parent visitors to the schools

Table VII-1. Minority Group Composition of Schools Selected for In-Depth Study*

In-Depth Study Schools	Percentage Minority Enrollment						
	0-10%	11-30%	31-50%	51-70%	71-90%	91-100%	Total
Elementary Schools	1	4	0	5	7	7	24
Secondary Schools	4	2	0	0	0	0	6
Total	5	6	0	5	7	7	30

*The information contained in Table VII-1 was taken from the ESAA grant application for the study year 1974-1975.

VARIABLE DEFINITION AND SOURCE, AND DESCRIPTIVE ANALYSIS

EQUALITY OF EDUCATIONAL PRACTICES

Several practices of school staff that were assumed to have implications for EEO were examined in the in-depth study. Two practices that might be important EEO indicators afforded no comparisons among the study schools. In one case--the extent to which assemblies focused upon cultural enrichment/cultural heritage themes, or featured minority people--insufficient data were collected on school assembly programs. In relation to the other practice--the extent to which minority students participated in cocurricular activities--we found that there were practically no cocurricular activities in the elementary schools, and only two of the high schools had a sufficient mixture of students to compare majority and minority participation.

Three important ways in which schools may provide equality of educational opportunity to students of all races are reported in this section: classroom seating patterns, use of multi-ethnic materials, and the use of positive and negative instructional reinforcement by the teacher.

The underlying assumption of the analysis described here is that students from any racial/ethnic group did not receive equal educational opportunity if they were segregated in classroom seating, if they systematically did not receive their proportional share of the positive reinforcement given by the teacher, or if they were exposed to classroom materials that were not representative of a multi-racial society. The first part of this chapter provides a description of these measures of EEO.

Segregated Seating Patterns Within Desegregated Schools

In each of the classrooms observed at each site, seating charts were completed that recorded students' race, sex, and seating location. Two separate measures of racial segregation were derived from these seating charts.

For the first measure, schools were ranked in terms of the number of observed classes that were racially homogeneous (i.e., 90 percent or more of the students in the class were either majority or minority). Of the 95 classes observed in the 16 desegregated elementary schools, 14 had homogeneous classes according to the above definition: nine classes were composed almost entirely of minority students and five classes were composed almost entirely of majority students. Ten of the 16 desegregated elementary schools were observed to have no homogeneous classes. In two schools, four of the six classes that were observed were racially homogeneous. Two schools had two homogeneous classes out of the six that were observed, and two schools had one homogeneous class out of six.

Of the six elementary schools with homogeneous classes, three had classes with a racial composition in proportion to what could be expected on the basis of chance probability (i.e., given the preponderance of one racial group in the school). In the three schools that remained, two reported extensive use of achievement grouping procedures to make class assignments.

The second index of racial segregation came from observation of segregated seating arrangements within desegregated classes. Unlike the previous measure of racial segregation, this particular index is not affected by the percentage of minority students in the school, or by school-level or class-level achievement grouping procedures. All seating arrangements examined in this analysis reflected seating assignments made by the teacher without the use of achievement grouping criteria. Chi-square or Fisher's Exact Tests were calculated for all seating charts that met the above criteria and showed some evidence of racial seating patterns. Each seating chart was divided into four or six cells, depending on the number of students in class. Evidence for racial segregation within desegregated classes was based on the statistical inference that minority and majority students were not randomly distributed among the cells in the seating chart ($\alpha \leq .10$).

Almost two-thirds of the desegregated elementary schools showed no evidence of segregated seating. For this analysis, data were obtained for four to six classes per site. In two schools, one class had a segregated seating pattern; two schools had two classes with segregated seating patterns; and in two schools, three or more classes were observed to have segregated seating patterns. As noted previously, only those classes were included where the teacher made the seating assignments.

Further analysis of the seating charts did not reveal a systematic difference in the seating location of minority students; they were just as likely to be concentrated in the front of the room as in the back of the room. They were also just as likely to be near the teacher's desk as away from it.

A word of caution should be interjected at this point. We are reporting the fact that segregated seating patterns were observed in some classes, in a little over one-third of the schools; we have no way of knowing if any teachers used segregated seating arrangements for the purpose of reducing interracial contact in desegregated classes. Teachers' intent may, for example, have been to reduce minority or majority students' feelings of isolation within desegregated classes. Nonetheless, the number of classes displaying non-random seating patterns seems appreciable, and, as we indicate later, this type of segregated seating pattern appears to be associated with other measures of EEO, such as the use of multi-ethnic materials and teacher use of positive and negative reinforcement.

The Use of Multi-Ethnic Instructional Material and Classroom Displays

Another area of interest in the in-depth study of EEO concerned the amount of multi-ethnic material observed in the selected classrooms. Observers inspected all forms of instructional material and class displays, and rated the amount of multi-ethnic material used in each class on a four-point scale. The in-depth study schools were found to vary in the use of multi-ethnic materials--nearly one-third of the desegregated elementary schools had two or more observed classes with no multi-ethnic material. Table VII-2 reports the observed use of multi-ethnic material in minority-impacted and desegregated schools.

Table VII-2. Use of Multi-Ethnic Material in Desegregated and Minority-Impacted Schools

Number of Observed Classes Per School Using No Multi-Ethnic Material*	Number of Schools	
	Minority-Impacted (90% or More Minority)	Desegregated (Less Than 90% (Minority or Majority)
None	3(42.9)	3(18.8)
1	0	6(37.5)
2	1(14.3)	4(25.0)
3	2(28.6)	1 (6.3)
4	1(14.3)	2(12.5)
	7(100%)	16(100%)

*The number of classes observed at each school was either five or six.

Instructional Reinforcement

Another observation made during the two-week site visits involved the amount of positive and negative reinforcement of students by the teacher. Three 10-minute observations of the teacher's responses to students' behavior were made during each day of observation. Observers recorded the race or ethnicity of the students involved in each of these teacher-student interactions. Teacher behaviors that were scored as "negative" (or unsupportive) included ignoring, isolating, or criticizing the student; sending the student out of the class; and not giving the student sufficient time to respond to a question. Positive teacher behavior included complimenting the student or indicating approval by other means, and giving the student additional responsibilities or privileges in class. Schools were coded as having a racial difference in exposure to positive or negative teacher behavior if the observed frequency of such behavior was greater than ± 10 percent of the proportion of each group (minority or majority) in all classes that were observed. Table VII-3 presents the distribution of schools in which different amounts of negative reinforcement were given to minority and majority students.

Table VII-3 reveals a racial bias against minority students in the allocation of negative (and positive) teacher behavior in five of the 16 desegregated elementary schools; in those schools, proportionately more negative reinforcement appeared to be directed toward minority students. In three schools, proportionately less negative teacher behavior appeared to be directed toward minority students, while in four of the 16 desegregated elementary schools, teachers were observed to direct proportional shares of negative and positive reinforcement to majority and minority students.

Although the number of cases was small, there was no evidence that differences in teacher reinforcement behavior varied with the percentage of minority students within desegregated elementary schools.

STUDENT INTEGRATION

One of the most important distinctions made in the literature of intergroup relations concerns the distinction between desegregation and integration (Cohen, Pettigrew, and Riley, 1972). Desegregated schools are those in which minority and majority students attend the same institution, are in close physical proximity, and yet maintain social distance from one another. Integrated schools, on the other hand, are those in which students of different racial-ethnic groups interact in work or in play. Two field observations were conducted by the observers to assess the degree of integration in the desegregated schools: (1) observations of student intergroup mixing during recess periods for the observed classes and (2) observations of intergroup mixing during the lunch hour.

Table VII-3. Comparison of Teacher Negative Reinforcement Directed Toward Minority/Majority Students*

Teacher Negative Reinforcement	Number of Desegregated Schools
More Likely Received by Minority Students	5(31.3)
Less Likely Received by Minority Students	3(18.8)
Received by Minority/Majority Students in Proportion to Their Numbers	4(25.0)
Insufficient Count of Reinforcement to Make Judgment	4(25.0)
	16(100%)

*The procedure used to calculate differences in teachers' reinforcement practices makes the categories of positive and negative teacher behavior mutually exclusive and exhaustive. Consequently, the schools showing differences in positive teacher behavior are the same as those showing differences in negative teacher behavior; that is, in three schools minority students were observed to receive more than their proportional share of positive teacher behavior, and in five schools they received less than their proportional share.

Both measures revealed substantial intergroup mixing in the in-depth elementary schools. For example, intergroup mixing was reported during both recess and lunch in 12 of the 16 desegregated schools (F-1: α = .07).

The degree of student integration appeared to be associated with the percentage of minority enrollment. The largest percentage of schools showing student integration during both recess and lunch occurred in the category of 50-75 percent minority (five schools out of five), compared to only three out of six schools with 75-90 percent minority enrollment.

STUDENT PERCEPTIONS OF EQUAL EDUCATIONAL OPPORTUNITY

Student perceptions of EEO represented another important area of investigation in the in-depth study. A key question in the anlysis was the extent to which variations in student perceptions of EEO were associated with independent observations of EEO-related school activity conducted during the on-site visits. If a relationship was found between student perceptions of EEO and the observational measures of educational practices, then it could be argued that school policy and practices may have had a bearing on how students perceive their educational opportunity at school.

Student perceptions of EEO were obtained from a student questionnaire that was developed for the ESAA national evaluation by a panel of experts in the fields of civil rights, minority-group relations, and survey and evaluation research (Coulson, Ozenne, Bradford, Doherty, Hemenway, and Van Gelder, 1976). The resulting School Climate Questionnaire is being administered to all students participating in the ESAA national evaluation at the beginning and end of each school year, starting in the fall of 1974. Separate instruments were developed for elementary and secondary schools, and two forms were developed for each level: Form A was designed to be administered in desegregated schools (less than 90 percent minority or majority enrollment), while Form B was designed for segregated schools (more than 90 percent minority or majority enrollment).

Two multiple-item scales of student perceptions of EEO derived from Form A of the School Climate Questionnaire were used in the in-depth analysis. The first scale is called Teacher-Student Interaction and consists of six items that correspond to the on-site observational measures of teacher reinforcement behavior that were used in the in-depth study. The items in this scale cover the following areas of teacher-student interaction:

a. How often does the teacher say something nice to the student?

b. How often does the teacher call on the student in class?

c. Does the teacher give the student sufficient time to respond to questions?

d. How often does the teacher extend privileges to the student?

e. How much responsibility is the student given in the classroom?

The second scale consists of three items related to students' perceptions of the principal:

a. Does the principal know the student by name?

b. Is the principal friendly to the student?

c. Does the principal treat the student fairly?

Student gain scores for the 1974-1975 school year were calculated for both of the student perception scales. (Gain refers to the students' perception of less discrimination or greater equality of educational opportunity.) The amount of individual student gain was averaged to provide a school-level index.*

Table VII-4 reports the distribution of desegregated elementary schools showing positive and negative change in the Teacher-Student Interaction Scale and the Treatment by Principal Scale.

Table VII-4. Distribution of Gain Scores on the Teacher-Student Interaction Scale and the Treatment by Principal Scale

Amount of Gain	Number of Desegregated Schools	
	Teacher-Student Interaction Scale	Treatment by Principal Scale
Positive Gain*	8(50.0)	8(50.0)
No Gain or Negative Gain	7(43.8)	7(43.8)
Missing Data	1 (6.3)	1 (6.2)
	16(100%)	16(100%)

*All schools showing positive gain were also at the median or above on pretest and posttest score.

Half of the desegregated elementary schools showed evidence of gain on both scales during the 1974-1975 school year. The gain scores did not appear to be affected by the percentage of minority enrollment in the desegregated schools.

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*As discussed in Chapter II, the psychometric properties of both scales are somewhat problematic. However, both scales appear to have high face validity, and, as will be shown in a later section of this chapter, the Teacher-Student Interaction Scale was found to be correlated with an observational measure of teacher-student interaction.

TEACHERS' AND PRINCIPALS' PERCEPTIONS OF EEO POLICY

Teachers and principals were asked, in interviews, about the importance they attached to school goals and policy decisions that might affect equality of educational opportunity in the school. Six separate indicators of staff perceptions of school policy in the area of EEO were obtained.

Teacher Perceptions of the Importance of Implementing Intercultural Curricula

Teachers were asked to rank seven decision areas in school policy from most important through least important (see Chapter III).* One such area was the implementation of intercultural curricula. Schools were ranked from high to low in terms of the relative emphasis placed on implementing intercultural curricula.

In most schools, this decision area was considered least important. For example, in 10 out of 16 desegregated elementary schools, teachers ranked intercultural curricula sixth or seventh among those listed. Teachers in minority-segregated schools were more likely to emphasize intercultural curricula; only two of the seven minority-impacted elementary schools ranked this decision area last or next-to-last in importance.

Principal Perceptions of the Importance of Implementing Intercultural Curricula

Principals were asked to rank the same seven decision areas in terms of their importance to school policy. Principal rankings of intercultural curricula were very similar to the teacher rankings described above--in 10 of the 16 desegregated elementary schools, principals ranked this decision area either sixth or seventh. Principals also assigned a low rank to intercultural curricula in three of the seven minority-segregated schools. Thus, in an overwhelming number of sites, both teachers and principals seemed to agree that the implementation of intercultural curricula had low priority as compared to other decision areas.

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*The seven decision areas were: selection of basic instructional materials; student grouping procedures; student grading procedures; kinds and availability of co-curricular activities; focus and eligibility requirements for teacher inservice training; school-community interaction; and implementation of intercultural curricula.

Teacher Perceptions of the Importance of Social Goals in School Policy

During the interview, teachers in the elementary schools were asked to rank the five most important long-range objectives of their school from a list of 13 goals. As described in Chapter III, the list of goals had been developed to reflect academic, psycho-emotional, social, and institutional objectives. The social goals were stated in terms that appeared to assess EEO-related activities:

a. Helping students learn to live with persons of a different racial or ethnic background.

b. Developing students' concern for others.

c. Helping students to appreciate the contributions of different cultures.

d. Developing curricula that provide opportunities for meaningful interaction between persons of different ethnic and racial backgrounds.

Teachers in all elementary (and secondary) schools placed considerably less emphasis on these school goals than on academic or psycho-emotional goals. However, in most schools, social goals were rated higher than institutional goals.

In 10 of the 16 desegregated elementary schools, not more than one of the above social goals was selected by teachers, and then it was rated last. Teachers in minority-impacted elementary schools placed even less emphasis on social goals.

Principal Perceptions of the Importance of Social Goals in School Policy

Principals were asked to rank the same list of school goals that was presented to teachers. With few exceptions, principals ranked social goals considerably higher than did teachers. For example, in seven of the 16 desegregated elementary schools, principals ranked at least two social goals higher than fourth. However, principals in minority-impacted schools assigned almost no importance to social goals.

Teacher Perceptions of Their Participation in Implementing Intercultural Curricula

A related question in the in-depth analysis of EEO concerns the amount of teacher participation in implementing intercultural curricula. Teachers were asked to indicate on a five-point scale the extent to which they participated in this decision area, relative to school administrators. In only one desegregated elementary school was teacher participation rated low (score = 1,2); teachers in nine schools rated their participation as moderate (score = 3);

while six of the schools scored high in teacher participation (score = 4,5). It is important to note that this item serves as an indicator of administrative input in implementing intercultural curricula, as seen from the perspective of the teachers. In other words, if teachers rate themselves low in participation, they are also saying that administrator participation is high. Somewhat greater participation was reported by teachers in minority-segregated schools. Over half of these schools scored high in teacher participation (four out of seven), while the remaining schools were scored as moderate.

Principal Perceptions of Teacher Participation in Implementing Intercultural Curricula

Principals were also asked to indicate, on a five-point scale, the degree of teacher participation in implementing intercultural curricula. As a general rule, principals tended to provide higher estimates of teacher participation than did teachers. More specifically, in 11 of the 16 desegregated elementary schools, principals rated teacher participation high (score = 4,5); in four of the schools, teacher participation was judged moderate (score = 3); and one principal indicated low teacher participation in implementing intercultural curricula.

Principals in minority-impacted elementary schools reported a similar level of teacher participation. In five of the seven minority-impacted schools, teacher participation was rated high; of the two principals in the remaining schools, one scored teacher participation as low, the other as moderate. Again, principal estimates of teacher participation in the area of intercultural curricula are defined as a measure of administrative input; in this case, however, from the perspective of the principal.

RACIAL-ETHNIC REPRESENTATIVENESS OF PARENT VISITORS TO THE SCHOOLS

The racial and ethnic representativeness of parent visitors in desegregated schools was assessed by asking teachers about the parents who visit the classroom, and by asking the principal about those who visit the school. Teachers in 11 of the 16 desegregated elementary schools reported a high correspondence between the race or ethnicity of parents who visit the classroom and that of the students; teachers in two schools reported minority over-representation (two schools had incomplete data). Principals reported representative involvement in eight schools, minority under-representation in six schools, and minority over-representation in two schools.

Although one measure deals with the classroom and the other with the school, teachers' and principals' reports were expected to agree. They did not. At nine schools parent visitors were judged representative by either the teachers or the principal, but not both. In only five schools did both the teachers and the principal report that parent visitors were representative.

Representative parent involvement was examined with respect to percentage of minority enrollment. The number of principals that estimated minority underrepresentation was found to vary directly with the proportion of minority students in school: that is, the larger the minority-student enrollment, the more likely the principal was to report that minority-group parents were underrepresented.

The foregoing discussion has introduced and described five major components in the in-depth analysis of EEO: equality in educational practices; student integration in desegregated schools; student perceptions of EEO; teachers' and principals' perceptions of EEO policy at school; and racial-ethnic representativeness of parent visitors to the school. In the next section, each of these dimensions of EEO is examined in relation to one another and in relation to student achievement gains in reading and math.

RELATIONAL ANALYSES*

This section presents the nine major findings that emerged during the relational analyses of EEO in the in-depth schools.

1. The elementary schools in the in-depth study appeared to reflect a consistent school-level pattern with regard to equality in educational practices.

Interrelationships were observed among three areas of equal educational practice: segregated seating in desegregated classes; the use of multi-ethnic material; and observed differences between minority and majority students in their exposure to positive and negative teacher behavior. The strongest relationship was obtained from the association of multi-ethnic materials with teacher reinforcement behavior (Table VII-5). Specifically, schools that used fewer multi-ethnic materials were the same schools that evidenced a bias against minority students in the allocation of positive and negative teacher behavior, while schools that used more multi-ethnic materials did not evidence such bias. In addition, schools displaying a racial seating pattern in desegregated classes were somewhat less likely to use multi-ethnic materials and somewhat more likely to show a bias against minority students in the teachers' use of negative and positive reinforcement.

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*Since the EEO analysis was based on only 16 schools, no phi values (ϕ) are reported in this chapter. Alpha levels were calculated using Fisher's Exact Test.

Table VII-5: Crosstabulation of Minority Student Exposure to Negative Teacher Behavior by Use of Multi-Ethnic Materials

		Minority Students More Likely to Receive Negative Teacher Behavior*		
		Yes	No	
Use of Multi-Ethnic Material	More	0(0.0)	7(100.0)	7(58.3)
	Less	5(100.0)	0(0.0)	5(41.7)
		5(41.7)	7(58.3)	12(100%)

$\alpha \leq .001$

Operational Definitions:

1. **Use of multi-ethnic materials**

More = Multi-ethnic materials were used in all, or all but one, of the observed classes.

Less = At least two observed classes had no multi-ethnic material.

2. **Minority Students More Likely to Receive Negative Teacher Behavior**

Yes = Minority students in observed classes received at least 10 percent more than their proportional share of negative teacher behavior.

No = Minority students in observed classes received a proportional share (or less) of negative teacher behavior.

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*Four schools were dropped because of insufficient data to make racial-ethnic comparisons.

2. Some inequality in educational practice appeared to be present in about one-third of the desegregated elementary schools selected for in-depth study.

The data presented in Table VII-5 indicate that of the 12 desegregated elementary schools in which observations were made of teacher behavior and the use of multi-ethnic materials, five were scored as having low EEO on both items (e.g., a bias against minority students in their exposure to negative teacher behavior, and two or more observed classes with no multi-ethnic materials). This figure represents a little over 40 percent of the schools that were examined on both dimensions.

Similar results were found in the distribution of scores for each of the three indicators of equality in educational practices. Thus, seven out of 16 desegregated elementary schools had two or more classes (out of six classes observed) that did not use multi-ethnic materials; in five out of 12 desegregated elementary schools, minority students received a disproportionate amount of negative teacher behavior; and seven out of 16 desegregated elementary schools were shown to have segregated seating patterns in at least one of the observed classes.

3. Schools with segregated seating patterns in desegregated classes were less likely to have student mixing during recess and lunch (F-2: $\alpha \leq .02$).

The relationship between segregated seating patterns and intergroup mixing is strong and statistically significant. These data indicate that students in schools with segregated seating patterns were less likely to be observed in intergroup mixing during recess and lunch than students in schools with no segregated seating patterns.

The next series of findings pertain specifically to teachers and principals of desegregated elementary schools.

4. In schools whose principals placed greater emphasis on social goals, student intergroup mixing during recess and lunch was more likely to be observed (F-3: $\alpha \leq .07$).

5. In schools whose principals placed greater emphasis on social goals, teachers were less likely to display a disproportionately high amount of negative behavior to minority students (F-4: $\alpha \leq .05$).

6. Schools whose teachers reported greater participation in decisions regarding intercultural curricula were significantly more likely to make extensive use of multi-ethnic materials (F-5: $\alpha \leq .01$).

These findings indicate that statements of EEO policy by principals and teachers, tended to coincide with observations of EEO practice in the in-depth study. The one observation item that was not related to the amount of emphasis placed on EEO policy was the use of multi-ethnic materials. Inspection of the data indicates that desegregated schools with large minority-student enrollments were likely to have multi-ethnic materials, regardless of the relative emphasis placed on social goals or intercultural curricula. However, while the degree of emphasis placed on EEO policy was not related to the observed use of multi-ethnic material, teacher estimates of their participation in decisions regarding intercultural curricula were strongly associated with the use of multi-ethnic material. In addition, it was found that when principals placed greater emphasis on decisions regarding intercultural curricula, segregated seating patterns were less likely to be observed.

7. In schools where principals reported that parent visitors were representative of the racial and ethnic mix of the students, greater use of multi-ethnic materials was observed (F-6: $\alpha = .07$).

The item assessing the racial-ethnic representativeness of parent visitors to the school came from the principal questionnaire. Of the seven principals who reported that parent visits were not representative, six indicated that minority parents were less likely to visit the school. Consequently, the above finding indicates that multi-ethnic materials were less likely to be observed in schools reporting that minority parents visited the school in proportionately low numbers. However, there is no way of determining from these data whether representativeness of visits by minority parents results in greater use of multi-ethnic materials, or whether the use of these materials serves to encourage visits from minority parents. Perhaps the representativeness of parent visits is merely one component of a more general climate of EEO that includes, among other things, the use of multi-ethnic materials.

8. At schools where principals reported that parents visited in proportion to the racial-ethnic mix of the students, there was a strong tendency for students to report improved teacher-student interaction (F-7: $\alpha \leq .03$).

The same caution that pertains to the interpretation of number seven above, should also be exercised when interpreting the relationship between representative parent visits and student perceptions of teacher-student interaction. That is, it is not possible to determine whether representative parent involvement had an effect on teacher behavior or student perceptions of teacher behavior, or whether representative parent involvement is simply part of a more general climate of EEO at school. What is known is that within the in-depth study sample of desegregated elementary schools, reports of representative parent involvement were associated with students' perceptions that their teachers' behavior was becoming more positive.

9. Racial-ethnic representativeness of parent visits to the school was not systematically related to perceptions of EEO policy at school.

Very little in the way of teacher or principal perceptions of school policy was found to be related to the representativeness of parent visits. For example, the degree of emphasis placed on social goals or decisions regarding intercultural curricula and the degree of participation in these decision areas by teachers and principals was not associated with the representativeness of parent visits.

ADDITIONAL RELATIONSHIPS

Two relationships were also found involving student perceptions of EEO and student outcome measures. First, elementary students were more likely to show gain on the Teacher-Student Interaction Scale in schools where teachers did not direct a disproportionately large amount of negative behavior towards minority students. It is important to note that the sample students in the desegregated schools were minority. Thus, the relationship found between on-site observations of bias in the exposure of minority students to negative teacher behavior and students' perceptions of such bias in teacher-student interaction is suggestive. In addition, it was found that elementary students were more likely to make reading achievement gains in schools that did not allocate a disproportionately high share of negative teacher behavior to minority students (F-8: $\alpha \leq .07$). Math achievement was also related to negative teacher behavior in the same direction, although the relationship was not statistically significant.

SUMMARY

Results of the analysis of EEO in desegregated elementary schools showed substantial variability. Observations of seating patterns within desegregated classes, the use of multi-ethnic materials, and teachers' use of positive and negative reinforcement behavior seemed to indicate that equality in educational practices reflected a consistent school-wide policy. Most of the schools appeared to have practices that provided equality of educational opportunity; about a third of the schools showed a bias against minority students.

Observations of EEO climate at school were shown to be related to teacher and principal perceptions of EEO policy. Observations of EEO practice were generally more equitable when teachers and principals reported greater emphasis on social goals and decisions regarding intercultural curricula. The amount of student intergroup mixing observed during recess and lunch was shown to be inversely related to the observation of segregated seating patterns at school.

Perhaps the most important dimension of EEO investigated in this study concerns teachers' negative reactions to student behavior. Schools in which teachers were observed to direct a disproportionately large amount of negative reinforcement toward minority students were less likely to show gains on the Teacher-Student Interaction Scale of the School Climate Questionnaire during the 1974-1975 study year; the students in these schools were also less likely to show reading achievement gains.

CHAPTER VIII

THE ANALYTIC PROFILE OF A SUCCESSFUL SCHOOL

The in-depth study was designed to provide detailed descriptions of a group of schools participating in the ESAA evaluation. The major objective of the study was to identify program and contextual components that were related to student achievement. To meet this objective, elementary schools that were more successful in reading or math were compared to a group of schools that were less successful in reading or math, but similar in other respects. (It is important to keep in mind that in the ESAA sample "successful" as well as "nonsuccessful" schools fell below the median in national achievement scores.) Successful and nonsuccessful schools were compared in terms of four major constructs:

- Organizational climate
- Parent and community involvement
- Instructional practices used in reading and math, and related teacher attitudes
- Instructional resources used in reading and math

In addition to examining factors related to student achievement, the in-depth study also examined factors related to equality of educational opportunity. The results obtained from descriptive and relational analyses have been reported in detail in Chapters III through VII. This chapter provides a review and summary of these findings, and presents additional results obtained from a multivariate analysis of the program components identified as statistically significant in predicting student achievement.

REVIEW AND SUMMARY OF MAJOR FINDINGS

ORGANIZATIONAL CLIMATE

The organizational climate of the school was investigated in terms of five major dimensions: long-range objectives, policy development, instructional supervision and guidance, support provided to teachers, and teacher satisfaction. The major results from this analysis were obtained from three interview items drawn from the areas of policy development and instructional supervision and guidance. It was found that:

a. Schools were significantly more likely to show math achievement gain when administrators assumed responsibility for selecting basic instructional materials.

b. Schools were significantly more likely to show math achievement gain when the principal emphasized decisions regarding the selection of basic instructional materials.

c. Schools were significantly more likely to show math achievement gain when teachers more accurately perceived the principal's instructional norms.

The face validity and high intercorrelations among these items suggested a common underlying dimension, which we have interpreted as constituting administrative leadership in basic skills instruction. The three items were combined into an Administrative Leadership Index. It was found that:

d. Schools characterized by strong administrative leadership were significantly more likely to raise math achievement and somewhat more likely to raise reading achievement.

Another result from the analysis of organizational climate was obtained from the area of support provided to teachers:

e. Schools were significantly more likely to show math gain where greater district-level support for new teachers was offered. Orientation courses, inservice training, and documentation of procedures were the most common forms of teacher support at the district level.

PARENT AND COMMUNITY INVOLVEMENT

Two major issues were investigated in the analysis of parent and community involvement at school. The first issue was the degree to which parent involvement was associated with certain promotional activities designed to increase parent participation at school. None of the promotional activities examined in this study (e.g., holding open house, providing evening entertainment, distributing school newsletters) were found to be associated with parent participation. However, it was found that parents were more involved in schools where the principal assumed more of the responsibility for establishing policy in the area of parent-community relations.

The second issue involved the relationship between parent participation and student achievement. Several interesting findings were obtained from this analysis, including:

a. Schools were significantly more likely to show math gain when parents were reported present in the classroom (e.g., as paid instructional aides, volunteers, or as visitors). The relation to reading achievement was also positive, although not statistically significant.

b. The relationship between paid parent aides and achievement does not imply a similar relationship between the general use of paid instructional aids and achievement; that is, where the type of aide was not specified (parent or non-parent), but where average hours of employment were compared, the use of aides was negatively related to achievement gain. Where paid parent aides were used, their hours of employment were typically short.

c. No relationship was found between parent participation outside the classroom (e.g., as clerks or on advisory committees) and student achievement.

READING AND MATH INSTRUCTIONAL PRACTICES

Many instructional practices were examined in the in-depth study, including the use of individualized and small-group instruction, the use of behavioral objectives and lesson plans, the adequacy of instructional practice and guidance, the provision of feedback to students, and the use of positive and negative reinforcement during instruction. Two attitudinal variables were also investigated: teachers' expectations for student achievement, and teachers' perceptions of their responsibility for student learning.

No significant relationships were found between student achievement and either the use of individualized and small-group instruction or the provision of instructional guidance by the teacher. Similarly, teachers' expectations for student achievement and teachers' perceptions of their role and responsibility in student learning were unrelated to achievement gain. However, the extent to which teachers used behavioral objectives, and the extent to which they provided students with opportunities for instructional practice and feedback (and attached importance to doing so), were found to be positively related to reading and/or math gain. The extent to which teachers provided certain kinds of positive reinforcement to students was found to be negatively related to achievement gain. These findings are summarized below.

a. Results related to the use of behavioral objectives showed that schools were significantly more likely to show reading and math gain when teachers made greater use of behavioral objectives. An index was created to assess the importance and use of behavioral objectives during reading and math instruction. This index consisted of the following three items: (1) whether teachers maintained student records that showed attainment of specific instructional objectives; (2) whether teachers placed a relatively high value on the use of behavioral objectives; and (3) whether teachers placed relative emphasis on revising lesson plans (rather than abandoning objectives) when instructional objectives were not attained. The association of this index with reading and math achievement was strong and statistically significant.

b. With regard to the use of practice sessions, results indicated that schools were significantly more likely to show reading gain when practice sessions were observed to include many of the steps necessary for mastery of the lesson objectives, and when practice sessions were relevant to the lesson objective (observer judgments). No relationship was found with math achievement gain.

c. Results of the investigation of feedback indicated that schools were somewhat more likely to show reading and math gain when teachers attached importance to providing written and oral feedback to students on their strengths and weaknesses. This relationship was not statistically significant for either criterion.

d. The investigation of the use of reinforcement produced results showing that schools were significantly less likely to show reading achievement gain when teachers were observed praising students and singling out students as positive role models more frequently. The same inverse relationship was obtained for math achievement, but the results were not statistically significant.

The relationships between achievement and the use of behavioral objectives, providing adequate practice for students, and the importance assigned to providing informative feedback to students (items a through c above), suggested a model of the instructional process for successful schools. To test the model, a combined measure of the instructional process was created by summing the individual scores of the three instructional variables (objectives, practice, feedback). The crosstabulation of the Instructional Process Index with student achievement showed that schools that scored higher on the index were significantly more likely to show gains in reading and math.

Regarding item d above, additional analyses suggest that teachers who had lower expectations for their students were likely to use more positive reinforcement; that greater use of positive reinforcement was associated with greater emphasis on psycho-emotional goals for the school; and that schools that used more positive reinforcement were less task-oriented during instruction (i.e., they provided less practice time and feedback).

INSTRUCTIONAL RESOURCES USED IN READING AND MATH

A variety of reading and math resources and their use were analyzed including class size, instructional time in reading and math, staffing practices, equipment and materials, inservice training, and teachers' education. The allocation patterns of these resources among the successful and less successful elementary schools yielded two findings:

a. Schools were significantly more likely to be successful in raising math achievement when more of their resources were allocated to remedial specialists. The same relationship was obtained for reading achievement, although the results were not statistically significant.

b. Schools were significantly less likely to be successful in raising math achievement when more of their resources were allocated to math instructional aides (as compared to remedial specialists).

EQUALITY OF EDUCATIONAL OPPORTUNITY (EEO)

The analysis of EEO in the in-depth study was based primarily on observed patterns of intergroup relations in desegregated elementary schools. Items dealt with segregated seating patterns, student intergroup mixing, the use of multi-ethnic materials, and differential patterns of negative and positive teacher behavior directed toward minority and majority students. Student perceptions of EEO were also assessed in terms of students' interactions with teachers and the principal, as reflected in the School Climate Questionnaire. Teachers and principals were questioned about school goals related to equality of educational opportunity, about the importance of intercultural curricula, and about who made the decisions to implement intercultural curricula.

The major descriptive findings from this analysis were as follows:

a. Slightly more than one-third of the 16 desegregated elementary schools were observed to have at least one segregated seating arrangement within desegregated classes, while three schools were observed to have at least one segregated class.

b. In nine of the 16 desegregated elementary schools, at least four observed classes used some multi-ethnic materials.

c. Teachers were observed directing a disproportionate amount of negative reinforcement to minority students in five schools; majority students were observed to receive a disproportionate share of negative teacher behavior in two schools.

d. Student intergroup mixing during recess and lunch was observed in 12 of the 16 desegregated elementary schools.

e. Eight of the 16 desegregated elementary schools showed improvement in student perceptions of EEO as measured by the School Climate Questionnaire.

The EEO analysis was also concerned with the interrelationships among these items. Several findings emerged from this analysis:

a. Student intergroup mixing was significantly more likely to be observed in schools that contained no segregated seating patterns within desegregated classes.

b. Student perceptions of teacher-student interaction were significantly more likely to improve in schools where parent visitors were reported to be representative of the racial and ethnic composition of the student body.

c. Desegregated schools were significantly less likely to have a disproportionate amount of negative reinforcement directed toward minority students when the principal placed greater emphasis on social goals.

d. Desegregated schools were significantly more likely to use multi-ethnic materials when teachers reported greater participation in decisions regarding the implementation of intercultural curricula.

Desegregated schools were somewhat less likely to show improvement in student perceptions of teacher-student interaction when teachers were observed directing a disproportionate amount of negative reinforcement to minority students. In addition, study results indicated that desegregated schools were significantly less likely to show reading achievement gain (but not math gain) when teachers were observed directing a disproportionate amount of negative reinforcement toward minority students.

MULTIVARIATE ANALYSIS OF SCHOOL SUCCESS

Up to this point, the analysis of school success has been based on a series of bivariate relationships with student achievement. The objective was to identify program variables that appeared to be related to achievement gain. Two additional study objectives were (1) to determine whether these program components were significantly related to achievement gain independently of student background, and (2) to develop a composite picture of school success. The bivariate analyses reported in Chapters III through VII do not provide this type of information. Reaching these objectives required the use of a multivariate analysis of school success (conducted in two steps) using several background and program dimensions as predictors variables in one integrated analysis.

Using the criterion categories of successful/nonsuccessful in reading and math achievement, a stepwise discriminant function analysis was selected for these purposes.* The objective of a discriminant function analysis is to predict an a priori classification of cases (e.g., successful schools versus nonsuccessful schools) based on a linear combination of predictor variables. The discriminant analysis performed in this study is similar to a stepwise regression analysis in which the dependent variable is dichotomized. Thus, the interpretation of a standardized discriminant function coefficient is analogous to the interpretation of a standardized beta weight; each discriminant function coefficient represents the relative contribution of its associated variable to the function in question. The canonical correlation coefficient was used to measure the degree of association between the function (i.e., the linear combination of predictor variables) and the variable that defines group membership.

The discriminant analysis was conducted in two steps. All procedures were performed separately for reading and math achievement. In the first step only student background characteristics (i.e., percent minority enrollment, socioeconomic level of the student body,** and 1974 pretest score) were entered into the equation. No significant relationship was found between the racial composition of the student body, 1974 pretest scores, the socioeconomic level of the student body, and the reading criterion. *** Consequently, the results with respect to reading achievement (reported in Chapters III through VI) do not appear to be seriously affected by the student background characteristics examined in this analysis. However, it is necessary to consider the effects of student background on math achievement, since systematic differences were found among successful and nonsuccessful schools in racial composition and math pretest score.

In the second step, each program variable found to be related to achievement gain (in the bivariate analysis) was added to the equation in a stepwise fashion. Program variables were entered into the equation based on their contribution to the overall prediction capability of the function, which was determined by the proportion of residual variance explained by each variable. Tables VIII-1 and VIII-2 report the relationships obtained between the reading and math criteria and the functions derived from the following program variables:

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*A parallel discriminant analysis was planned for the second major outcome measure in the ESAA evaluation, student perceptions of EEO within desegregated schools. However, the small number of desegregated schools (16) precluded a reliable multivariate analysis of the EEO outcome measure (see Appendix A).

**The socioeconomic level of the student body was measured by student reports of luxury items in the home.

***As a precautionary measure, the tolerance level that determined entry into the discriminant function equation was reduced for the reading criterion from $\alpha \leq .01$ to $\alpha \leq .10$. However, the student background variables failed to reach this minimum level of statistical significance.

a. Administrative Leadership Index

b. District-level support for new teachers

c. Parent Involvement in the Classroom Index

d. Behavioral Objectives Index

e. Adequacy of instructional practice

f. Less frequent use of positive reinforcement

g. Per-pupil costs for remedial reading/math specialists

A summary of these findings is provided below for both reading and math achievement.

READING ACHIEVEMENT

The optimal combination of program variables for predicting the reading criterion, listed in order of their relative contribution to the total function score, was: (1) adequacy of instructional practice; (2) parent involvement in the classroom; (3) the use of behavioral objectives during reading instruction; (4) less frequent use of positive reinforcement; and (5) per-pupil costs for remedial reading specialisits.

The program variables listed above are ranked in order of their relative contribution to the total function score. Thus, adequacy of instructional practice made the largest contribution to the prediction equation, followed closely by parent involvement in the classroom. The relative contributions of behavioral objectives, less frequent use of positive reinforcement, and remedial reading specialists were considerably lower; however, each of these program variables was significantly related to the reading criterion.

Table VIII-1. Discriminant Function Analysis of Selected Program Variables and Reading Achievement*

Variables in Function	Standardized Discriminant Function Coefficients
Adequacy of Instructional Practice	.65
Parent Involvement in the Classroom	.62
Use of Behavioral Objectives in Reading Instruction	.32
Use of Positive Reinforcement	-.29
Per-Pupil Costs for Remedial Reading Specialists	.23

Correct Predictions	Number (Percent)
Successful Schools (N=9)	9 (100%)
Nonsuccessful Schools (N=15)	15 (100%)
Total (N=24)	24 (100%)

Correlation = .86

Significance** < .001

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*The student background variables of percent minority, pretest score, and socioeconomic class were not significantly related to the reading criterion; they did not remain in the prediction equation even though they were the first variables entered.

**Significance level for the discriminant function is based on the chi-square distribution with 5 degrees of freedom.

Table VIII-2. Discriminant Function Analysis of Student Background Variables, Selected Program Variables, and Math Achievement

Variables in Function	Standardized Discriminant Function Coefficients
Percent Minority Enrollment	-.46
Per-Pupil Costs for Remedial Math Specialists	.44
Parent Involvement in the Classroom	.39
Pretest Math Score	-.27
Use of Behavioral Objectives in Math Instruction	.25
Administrative Leadership	.20
District-Level Support for New Teachers	.19

Correct Predictions	Number	(Percent)
Successful Schools (N=14)	14	(100%)
Nonsuccessful Schools (N=10)	10	(100%)
Total (N=24)	24	(100%)

Correlation = .90

Significance* < .001

*Significance level for the discriminant function is based on the chi-square distribution with 7 degrees of freedom.

Based on the information contained in this equation, all 24 elementary schools were correctly classified as successful or nonsuccessful; the canonical correlation was .86. The success of this equation in predicting the reading criterion is particularly noteworthy, since the entire function consisted of program variables that are subject to policy intervention.

MATH ACHIEVEMENT

The optimal prediction equation for the math criterion combined five program and two background components. These components, listed in order of their relative contribution to the total function score, are: (1) percent minority enrollment; (2) per-pupil costs for remedial math specialists; (3) parent involvement in the classroom; (4) math pretest score; (5) the use of behavioral objectives during math instruction; (6) administrative leadership; and (7) district-level support for new teachers.

The relative contributions of per-pupil costs for remedial math specialists, parent involvement, and percent minority enrollment (with opposite sign), were virtually identical and accounted for approximately 60 percent of the total function. Pretest math score, the use of behavioral objectives, administrative leadership, and district-level support for new teachers ranked somewhat lower.

Perfect prediction of the math criterion was obtained from the information contained in this equation; the canonical correlation was .90. It is important to note that this function, like the reading equation described above, was weighted heavily by program variables that can be influenced by educational policy. When only the background variables of percent minority enrollment and pretest score were used to predict the math criterion, the correlation was .57 and the number of misclassified schools was 7 out of 24 (70.8 percent accuracy); but when the five program variables were added, the correlation was .90 and no schools were misclassified.

PROGRAM COMPONENTS COMMON TO BOTH READING AND MATH ACHIEVEMENT

Aside from the fact that these prediction equations are 100 percent accurate, one interesting observation is that both equations contain a similar set of program components, although the relative contribution of each component differs from one equation to the other. Thus, in the ESAA in-depth schools, the key elements of success in both reading and math achievement included: (1) parent participation in the classroom; (2) the use of objectives; and (3) relatively high per-pupil costs for remedial specialists.

It should be noted that two program components did not remain in the reading equation (Administrative Leadership Index, and district-level support for new teachers), while two different components did not remain in the math equation (frequent use of positive reinforcement, and the adequacy of practice). These results are consistent with the findings derived from the cross-classification analyses reported earlier. In the tabular analysis, administrative leadership and district-level support were related to math gain but not to reading gain; similarly, less frequent use of positive reinforcement and adequacy of practice were related to reading gain but unrelated to math gain.

SECONDARY DISCRIMINANT ANALYSIS

A second discriminant analysis was conducted using only those variables that were excluded from the first series of predictor equations. This was done in order to insure that the non-relationships reported above did not result from:

a. Multicolinearity among the independent variables (i.e., two or more independent variables being highly intercorrelated).

b. The small sample size and its associated effect on the "degrees of freedom" in the analysis.

c. A lack of residual variance in the dependent variable.

The results obtained from the second discriminant analysis were largely consistent with the findings reported earlier. The only variable in the secondary analysis that was significantly related to achievement gain was the use of positive reinforcement. Less frequent use of positive reinforcement was associated with math achievement. However, as Table VIII-3 indicates, the contribution of this variable to the total function score was small.

DISCUSSION AND SUMMARY

The 1974-1975 in-depth study was designed and conducted as an exploratory investigation of program and contextual factors related to achievement. The study was conducted in conjunction with the National Evaluation of the Emergency School Aid Act. The analysis of school success was guided by a conceptual model that identified four key dimensions of a reading and math program, each of which were found to be significantly related to reading or math gain, independent of student background characteristics. These four dimensions are:

Table VIII-3. Discriminant Function Analysis of Student Background Variables, Use of Positive Reinforcement, and Math Achievement

Variables in Function	Standardized Discriminant Function Coefficients
Percent Minority Enrollment	-.82
Pretest Math Score (1974)	-.91
Use of Positive Reinforcement	-.33
Correct Predictions	**Number (Percent)**
Successful Schools (N=14)	12 (85.7%)
Nonsuccessful Schools (N=10)	6 (60.0%)
Total (N=24)	18 (75.0%)
Correlation = .61	
Significance* ≤ .03	

*Significance level for the discriminant function is based on the chi-square distribution with 3 degrees of freedom.

- Organizational Climate, which produced a composite index of administrative leadership and a measure of district-level support for new teachers that predicted math gain.
- Parent and Community Involvement, which produced an index of parent participation in the classroom that predicted both reading and math gain.
- Reading and Math Program Characteristics, which resulted in three indices that predicted achievement gains: the use of behavioral objectives, the provision of adequate instructional practice, and less frequent use of positive reinforcement.
- Reading and Math Resource Use, which uncovered a relationship between achievement gain and per-pupil costs for remedial specialists.

Strong relationships were observed between program variables and student achievement, and a multivariate (discriminant function) analysis appeared to confirm the predictive capability of seven program components:

a. Parent involvement in the classroom

b. Per-pupil costs for remedial specialists

c. The use of behavioral objectives

d. Adequacy of practice

e. Administrative leadership

f. District support for new teachers

g. Less frequent use of positive reinforcement

It must be emphasized that the success of the analyses reported above does not demonstrate causality between these program components and student achievement. The in-depth study was not based on a rigorous experimental design, and the study sample was relatively small and non-randomly selected. Thus, one or more of the above findings could be spurious, resulting from sampling error or systematic "non-program" differences that existed among the successful and non-successful schools prior to the in-depth study. On the other hand, it should be noted that the pre-existing differences that were examined (percent minority enrollment, socioeconomic level of the student body, and pretest score) do not appear to explain the relationships obtained in this analysis.

COMPARABILITY AND CROSS VALIDATION WITH PREVIOUS RESEARCH

The findings reported in this study tend to support results of previous studies. For example, Hawkridge, Chalupsky and Roberts (1968) reviewed 18 successful programs and 25 nonsuccessful programs, and identified 91 separate treatment variables that were categorized in terms of personnel, method, service, and equipment. Their analysis identified six major components that appeared to be more characteristic of successful programs than of unsuccessful ones: (1) instructional objectives/careful planning; (2) teacher training; (3) small-group or individualized instructions; (4) relevance of instruction; (5) high treatment-intensity; and (6) active parent involvement.

More recently, Wargo, Tallmadge, Michaels, Lipe and Morris (1972) conducted a similar review in which 21 successful programs were examined, using the same six components identified by Hawkridge and associates. Findings from this review largely substantiated the Hawkridge study. For example, 16 of the 21 successful projects used instructional objectives and employed teachers who were specifically trained in the methods of the designated instructional approach. Similarly, 18 of these projects made use of individualized instruction, while 14 projects were judged to provide instruction relevant to lesson objectives. In the same study, Wargo and associates reviewed findings from six additional studies. The use of lesson objectives, parent involvement, and individualized instruction were again identified as key components of successful compensatory programs.

Results from the in-depth study seem to be consistent with previous findings. The use of behavioral objectives and parent participation in the classroom are two cases in point. Similarly, the adequacy of instructional practice as a component of successful compensatory programs also received support from the in-depth study. However, other program components that were found to be critical in previous studies (variations in teacher training, or small-group and individualized instruction) were not identified with school success in the in-depth study.

APPENDIX A

STATISTICAL TECHNIQUES USED IN THE IN-DEPTH STUDY

APPENDIX A

STATISTICAL TECHNIQUES USED IN THE IN-DEPTH STUDY

One of the major objectives of the ESAA in-depth study was to identify and describe the characteristics of successful instructional programs and the contexts in which they operate. To help identify the unique characteristics of successful programs, a small number of schools with nonsuccessful programs have been compared to schools with successful programs. During February and March, 1975, trained observers spent two weeks at each site observing classroom and school-level behavior, distributing and collecting self-administered questionnaires, and conducting interviews with selected teaching and administrative staff.

Chapter I provided a brief overview of the in-depth study methodology, including the bases for site selection, instrument development, selection and training of field staff, and data collection procedures. Chapter II described in greater detail the unit of analysis and the criteria that were used to define school success in reading and math achievement. This appendix provides a more detailed account of the data analysis techniques that were used in the in-depth study.

The basic design of the in-depth study included a selection measure of reading and math achievement that was obtained from the adjusted gain scores for 1973-1974. Program data were then collected during mid-academic year 1974-1975. The major thrust of the in-depth analysis has been to relate these program descriptions to achievement gains in 1974-1975.

One of the most important considerations in determining the choice of statistical techniques was the size of the sample in the in-depth study. Since the unit of analysis was the school, a maximum of only 24 cases were examined. Constraints of data characteristics and level of measurement determined the use of several nonparametric statistical* tests that were applied to cross-classification tables like Table A-1 shown below.

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*The term "nonparametric statistics" refers to statistical tests that require fewer assumptions about population parameters. Nonparametric techniques were specifically designed for application to data with unknown distributions and/or research data that are measured in terms of categories or rank (e.g., high, medium, low) rather than intervals. For an excellent discussion of nonparametric statistics and their relation to classical tests of statistical significance and association, see Bradley (1968: 15-44).

Table A-1. Crosstabulation of Administrative Leadership Index by Math Achievement Gain 1974-1975

		Math Achievement Gain		
		High	Low	
Administrative Leadership Index	High	11(84.6)	2(15.4)	13(54.2)
	Low	3(27.3)	8(72.7)	11(45.3)
		14(58.3)	10(41.6)	24(100%)

$\phi = .49$ $\alpha \leq .02$

The eight different statistical tests used for various purposes in the in-depth analysis are briefly described below.

1. Chi-Square Test of Statistical Significance

   The chi-square test (χ^2) assesses the probability that a given relationship between two variables is due to chance. (The formula for χ^2 can be found in any introductory statistics book.) This test was used to infer whether two groups of schools (e.g., successful and nonsuccessful) differed in terms of some program characteristic. For the data in Table A-1, χ^2 provides a probability estimate of a chance relationship of $\alpha \leq .02$. Since the probability that this relationship was due to chance is quite small (i.e., 2/100), we have inferred that it is "statistically significant." (The traditional decision rule for determining statistical significance is $\alpha \leq .05$). Although χ^2 is a nonparametric test of statistical significance, it will become unstable when the number of cases is quite small. Yates (1934) developed a technique for correcting χ^2 in small sample analyses, and Yates' correction factor has been routinely applied.

χ^2 estimates whether two variables are associated with one another in a contingency table, but says very little about how strongly the two variables are associated. χ^2 is partly determined by the number of cases being analyzed, and by the number of cells in the table. The estimate of the strength of the relationship is more adequately provided by the phi coefficient (described below) which is a function of χ^2.

2. Fisher's Exact Test

Fisher's Exact Test (Fisher, 1934) was used when the number of cases was less than 21. Fisher's test calculates the exact probability (α) with which a given pattern of frequencies occurs under the condition of chance or random association. Like χ^2, Fisher's test is a measure of statistical significance rather than of the strength of the relationship. The formula for the Fisher's Exact Test can be found in Seigel (1956) or Bradley (1968).

3. Phi Coefficient of Statistical Association

For 2 x 2 tables, the phi statistic (ϕ) was used as a measure of the strength of a relationship. As noted above, ϕ is a function of χ^2 that serves as a correlation coefficient. As such a coefficient it generally ranges from -1.0 to +1.0 and is interpreted in a manner similar to all product-moment correlation coefficients, but is generally evaluated for statistical significance through its relationship to χ^2.*

4. Kendall's Coefficient of Concordance

One of the analysis objectives in the study of Organizational Climate was to describe the level of agreement among teachers with respect to the organizational goals of the school. To provide a probability interpretation for the amount of teacher agreement, Kendall's coefficient of concordance (W) was used (Kendall, 1970).

W assesses the probability that the correspondence among a set of rankings occurs as a result of chance probability. This test does not measure the amount of agreement on each alternative being ranked, but the overall agreement of the respondents' rankings. Unranked alternatives were augmented by calculating the average rank score for the remaining alternatives, and assigning this value to the unranked categories. W was then computed on the augmented ranks. Tied ranks were handled in the manner prescribed by Seigel (1956: 217). Significant agreement among the set of rankings is inferred when the probability for chance or random agreement is quite small ($\alpha \leq .05$).

5. Spearman's Rank Order Correlation Coefficient

The Spearman correlation assesses the degree of correspondence between two sets of rankings, assuming at least an ordinal level of measurement. This test was used to assess the level of agreement between teacher and principal rankings in two areas of organizational climate: policy development and long-range objectives.

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*However, this study reports phi values without the sign, indicating the strength of a relationship only. Direction is always explicit in the accompanying statement.

Spearman's rank order correlation is a nonparametric analogue to the popular Pearson correlation coefficient. The rank order correlation has a range of values extending from ±1.0. A value of 0 indicates that no relationship exists between the two sets of rankings, while a perfect positive or negative relation is signified by +1.0 and -1.0. The computational formula for the Spearman correlation can be found in Seigel (1956).

6. t test

In the resource allocation analysis (Chapter VI), several relationships with student achievement were examined using the t test (based on the assumption of independent samples). The t statistic is a parametric test of the "significant difference" between two or more arithmetic means, and assumes equal interval measurement. This test was used to assess the probability of chance or random differences occurring among successful and nonsuccessful schools in terms of standardized per-pupil expenditures for selected program resources (see Appendix B). The computational formula for the t test can be found in any introductory statistics book.

7. Confidence Intervals for School-Level Proportions in Minority Student Enrollment

One of the key research questions in the analysis of EEO was whether segregated classes were observed in the desegregated elementary schools. In the in-depth study, desegregated schools were arbitrarily defined as those having less than 90 percent minority or majority student enrollment.

One problem in this analysis was that the proportion of minority/majority students observed within a given class is partially determined by the proportion of such students in the school at large. Thus, in order to determine whether minority or majority students were disproportionately grouped in different classrooms, the proportion of minority/majority students observed in a particular classroom had to be compared to the school-level proportion.

To provide a probability interpretation for the occurrence of a particular number of minority students in a class, 95 percent confidence intervals were calculated for the school-level proportion of minority/majority students. The proportion of minority students in the observed classes were then compared to the lower and upper limits of the confidence interval for the school. Statistical evidence for the existence of segregated classrooms was based on the finding that the class level proportion did not fall within the critical values of the confidence interval calculated for the school. The computational formula for calculating confidence intervals for population proportions can be found in most introductory statistics books.

8. Discriminant Function Analysis

Discriminant function analysis is a multivariate technique for testing the ability of a set of predictor variables to discriminate (i.e., predict) between two or more groups of cases. A discriminant analysis was performed in this study to assess the predictability of two groups of schools; those that were academically successful and those that were less successful. In a discriminant analysis a linear prediction equation is calculated that differentially weights a series of predictor variables so that maximum prediction is obtained. Results from the discriminant analysis were used to assess the *relative* contribution of each program dimension to school success, and provided a statistical basis for an overall evaluation of the conceptual model adopted for in-depth study. Cooley and Lohnes (1971), Tatsuoka (1971) and Van de Geer (1971) discuss the mathematical theory and application of discriminant function analysis.

The specific type of discriminant analysis conducted in the in-depth analysis is similar to a step-wise regression in which the dependent variable is dichotomized. The interpretation of a standardized discrimination function coefficient is analogous to the interpretation of a standardized beta weight. Thus, each discriminant function coefficient represents the relative contribution of its associated variable to the function in question.

The discriminant analysis was performed in two steps. In the first step only the student background characteristics of percent minority enrollment, 1974 pretest score, and the socioeconomic class of the student body were entered into the equation. In the second step of the analysis the program variables of interest were added to the equation in a stepwise fashion. Program variables were entered into the equation based on their contribution to the overall prediction capability of the function, which was determined by the proportion of residual variance that was explained by each variable. This procedure resulted in a prediction function that maximized the amount of explained variance in the reading and math criterion. The minimum tolerance level that determined entry into the equation was set at $\alpha \leq .01$. A Bayesian adjustment was also made to account for the differential probability of group membership based on the number of cases in both criterion groups.

A parallel discriminant function analysis was also planned for the second major outcome variable in the ESAA evaluation, student perceptions of equal educational opportunity (EEO) within desegregated schools. However, the number of desegregated elementary schools in the in-depth study was quite small (16), and only two program variables were found to be significantly related to the EEO criterion (one of which had missing data on four of the 16 schools). Consequently, the discriminant analyses intended for the EEO criterion was abandoned because of an insufficient number of cases.

APPENDIX B

RESOURCE ALLOCATION AND COST METHODOLOGY

APPENDIX B

RESOURCE ALLOCATION AND COST METHODOLOGY

The in-depth study resource and cost analysis was designed to provide information on three questions important to educational policy:

- What were the major types of instructional resources used in providing reading and math instruction to ESAA students, and how were the resources utilized?
- Were there systematic differences among successful and nonsuccessful schools in the way these resources were used during reading and math instruction?
- What were the resource cost differences among successful and nonsuccessful programs; that is, did successful schools spend their money differently than the less successful schools?

Two very different approaches can be used when answering these types of questions. One approach is based on school district budget or expenditure data, collected from district accounting records and year-end financial reports to the state and federal governments. When district-level per-student costs are used to assess the type and level of resource use within a school, one must assume uniform resource allocation among all students in the school and district. However, this assumption is usually contrary to actual practice; schools will frequently allocate a disproportionate share of the resources to students with special needs (e.g., cognitive or nutritional needs, among others).

An additional problem in using budgetary data to assess the type and quantity of resource use is that such data only reflect recently purchased instructional resources. Many instructional resources are inherited from previous programs or years of operation. Using budgetary data prohibits the identification of these inherited resources, and hence distorts one's view of the resources that are actually used within a school or program.*

A more appropriate strategy for assessing resource use is based on class-level information. Instead of focusing on district-level average expenditures, this approach focuses on the types and quantities of resources actually used by teachers who provide reading and math services to the sample students.

The major advantage to this approach is that it is not necessary to assume that all students in a school receive the same instructional exposure. The resource allocation estimates derived from the classroom can also be used to calculate the program costs associated with providing reading and math instruction in the observed classes. For these reasons, this latter approach was adopted for the in-depth analysis of school resources.

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*For an excellent discussion of the measurement and analytic problems when looking at the impact of resources on student achievement, see Spady (1973).

The instructional resources of primary concern in this study include those that bear on the provision of reading and math instruction, including:

a. Teaching Staff--classroom teachers, reading specialists, math specialists, instructional aides, and resource teachers.

b. Support Staff--psychologists, counselors, speech therapists, principals, and librarians.

c. Equipment--tape recorders, record players, projectors, teaching machines, controlled readers, and listening centers.

d. Materials--self-instructional programs, non-text books, instructional games, and supplies.

e. Staff Development--reading and math inservice training.

Data on the above resources were collected from the teacher self-administered questionnaire and through classroom observation. Teachers were asked how much time they used special instructional equipment and materials during reading and math, and how much time they devoted to reading and math instruction in the observed classes. Similarly, estimates were obtained regarding the amount of time support staff assisted teachers and students in the observed classes. In each case, data on classroom resources were aggregated to the school in order to compare successful schools with less successful schools.

To control for variations resulting from cost-of-living differences among districts, standardized prices were used for each type of resource included in the in-depth analysis. (Standardized prices are averages, calculated from a range of prices for each type of resource.) The procedures used to determine standardized prices for each resource varied somewhat. For classroom teachers, a standardized (average) salary scale was constructed from salary information collected from each district participating in the in-depth study. Table B-1 lists the standardized salaries used to calculate teacher costs for providing reading or math instruction.

Each teacher's cost for teaching reading or math was calculated by multiplying the proportion of time spent in reading or math by the teacher's average annual salary. The school's overall teacher cost for providing reading and math to sample students was calculated by summing all teacher costs for reading and math.

Table B-1. Elementary Classroom Teacher Salary Scale Used in the In-Depth Study (Includes Fringe Benefit Factor of 15%)

Years' Experience	B.A. Degree	M.A. Degree
1 or less	$ 9,006	$ 9,987
2	9,466	10,504
3	9,926	11,021
4	10,386	11,538
5	10,846	12,055
6-10	11,766	13,089
11-15	12,686	14,123
16-20	13,606	15,157
Over 20	14,526	16,191

A similar procedure was followed in calculating the average salaries of other school staff. Salary information for principals, math and reading specialists, instructional aides, etc., were collected from each site and used as the basis for calculating average salaries. Table B-2 presents these additional average salaries.

Table B-2. Average Salary Schedule for Other Elementary School Staff Used in the In-Depth Study (Includes Fringe Benefit Factor of 15%)

Staff Type	Average Salary
Principal	$ 20,900
Math Specialist	12,915
Reading Specialist	13,552
Instructional Aide	4,304
School Counselor	14,092
School Psychologist	17,952
Speech Therapist	13,235
Librarian	13,193

The average salaries in Table B-2 were calculated without regard for level of formal education or previous experience. A quantitative estimate of average salary and the amount of time each person devoted to the observed classes formed the basis for calculating the cost contribution of these additional staff to the math or reading program.

Instructional equipment and material costs were calculated in a somewhat different way. The cost for each type of equipment and material includes an estimate of the average annualized capital cost of the item, as well as an estimate of the average annual maintenance cost associated with the use of the item in the classroom. Using the life expectancy for each type of equipment--which ranged from 5 to 10 years--the average annualized capital cost was calculated by dividing the total capital cost per unit by the life expectancy.* The average annual maintenance costs associated with using each type of equipment was calculated by using a standardized factor. Haggart (1971) has proposed using a standardized factor of 15 percent of the total cost of a piece of equipment. However, due to recent inflation, a factor of 20 percent of the average cost for each unit of equipment was used. Table B-3 presents the standardized prices for each type of equipment included in this analysis. Equipment costs were determined by multiplying the amount of time each teacher used a particular type of equipment by the average annual operation and maintenance cost figures. These cost figures were summed to the school level to obtain an estimate of equipment costs for teaching reading and math in each school.

Although only limited information was collected on the instructional materials used in the observed classes, standardized prices were used to estimate the costs of materials. For non-text books, instructional games, and other supplies, annual use costs were calculated on the basis of annualized capital costs and replacement costs per unit. The standardized annual use cost for non-text books and instructional games are 79 cents and $1.16 per unit, respectively. The total cost for each type of material was calculated by multiplying the quantity of resources available in each classroom by the standardized annual cost. The results were summed to obtain a school-level cost estimate.

A standardized figure of $7.99 per student was used for other teaching supplies. This estimate represents an average calculated from information obtained from ten randomly selected districts participating in the in-depth study. This figure was multiplied by the number of students in the observed classes to determine the overall annual costs of teaching supplies for the observed classes in each school.

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*For each type of equipment, an average price per unit was used instead of the actual price. This was necessary because information was not collected on specific brands and models in the schools. The list of standardized (average) prices is based on RMC's 1973 list of educational equipment adjusted for an annual rate of inflation of 8.5 percent (Dienemann, Flynn, and Al-Salam, 1974).

Table B-3. Standardized Unit Equipment Costs Used in the In-Depth Study

Equipment Type	Average Cost Per Unit	Life Expectancy (in Years)	Average Annualized Capital Cost Per Unit	Average Annual Maintenance Cost	Average Annual C & M Cost
Tape Recorder	$ 109.55	5	$ 21.91	$ 21.91	$ 43.82
Record Player	79.74	5	15.95	15.95	31.90
Movie Projector	562.13	10	56.21	112.43	168.64
Slide Projector	127.71	10	12.77	25.54	38.31
Opaque Projector	324.58	10	32.46	64.92	97.38
Overhead Projector	128.65	10	12.87	25.73	38.60
T.V.	239.45	10	23.95	47.89	71.84
Polaroid Camera	149.29	5	29.86	29.86	59.72
Video Tape Unit	1,989.00	10	198.90	397.80	556.70
Filmstrip	99.10	10	9.91	19.82	29.73
System 80	236.49	5	47.30	47.30	94.60
Headsets	3.31	5	.66	.66	1.32
Filmloop Projector	167.31	10	16.73	33.46	50.19
Hoffman Reader	455.13	10	45.51	91.03	136.54
Controlled Reader	291.33	10	29.13	58.29	87.40
Listening Center	72.54	10	7.25	14.51	21.76
Radio	55.87	5	11.17	11.17	22.34
Movie Camera	140.40	5	28.08	28.08	56.16
Film Previewer	27.50	5	5.50	5.50	11.00
Language Master	310.05	10	31.01	62.01	93.02

A general estimate of reading and math inservice costs for classroom teachers was calculated by multiplying each teacher's hourly rate by the total hours of training received during the past year. Districts vary in terms of their policies for compensating teachers for inservice training. Some districts directly compensate their teachers for participation or allow them to participate on released time; other districts expect teachers to participate in inservice training on their own time. The purpose in using an hourly rate to estimate inservice training costs was to obtain a consistent cost metric on which schools could be compared.

An additional problem with the inservice training cost estimates is that they reflect teacher costs for attending, and thus do not include the planning and implementation costs associated with the training programs. Information on these latter costs was not available for analysis.

Along with quantitative resource data, the procedures outlined above were used to develop a set of comparable program cost estimates for each elementary school participating in the ESAA in-depth study. Since only six secondary schools are included in this study, a comparative cost analysis at the secondary level was not possible.

APPENDIX C

TABLES FOR ORGANIZATIONAL CLIMATE

Table C-1. Number of Schools Showing Varying Degrees of Emphasis Placed on School Goals

	Number of Schools									
	Emphasis by Teachers					Emphasis by Principals				
	None - - - Some - - - Much					None - - - Some - - - Much				
Type of Goal	0	5-20	25-50	55-75	80-90	0	5-20	25-50	55-75	80-90
Academic	0	0	9	13	2	0	7	8	5	3
Psycho-emotional	0	1	3	7	13	0	1	10	2	11
Institutional	18	3	2	1	0	15	7	2	0	0
Social	5	15	4	0	0	4	5	7	5	3

Operational Definitions and Procedures

Respondents were presented with a list of 13 school goals and asked to select and rank five in terms of their importance. Weights were assigned to ranks as follows:

1st place = 50
2nd place = 40
3rd place = 30
4th place = 20
5th place = 10

The range of scores possible for each type of goal were as follows:

Type of Goal	Number of Goals Listed	Range of Scores
Academic	3	0 to 120
Psycho-emotional	2	0 to 90
Institutional	4	0 to 140
Social	4	0 to 140

Teacher ranks were averaged over all teachers at a school, which resulted in a small number of tied ranks. Goals receiving tied ranks were assigned a weighted score representing the average between the tied rank and the succeeding rank (e.g., two goals tied for 2nd rank, both received the average of 2nd and 3rd rank = 35).

Scale scores were created by summing scores across all goals of the same type. No adjustment was made for the fact that potential maximum scores varied from one goal type to another. However, the scores do provide a relative ranking, since in no case was the least possible maximum score (90) exceeded.

Table C-2. Distribution of Scores on the Administrative Guidance Scale

Scores	Number of Schools
0-2	3 (12.5%)
3-5	8 (33.3%)
6-8	13 (54.2%)
	24 (100%)

Operational Procedures

Scores on the Administrative Guidance Scale were obtained by summing teachers' and principals' responses to the following items:

	Yes	NC*	No
• Many faculty meetings are devoted to a discussion of goals and methods.	2	1	0
• The administration arranges to have inservice training programs that stress the kinds of teacher behavior desired by the administration.	2	1	0

*NC refers to less than two-thirds agreement among teachers (i.e., no consensus).

Table C-3. Degrees of Accuracy in Teachers' Perceptions of Principal's Instructional Norms

Number of Principal's Instructional Norms That Teachers Correctly Perceived	Number of Schools
0	2 (8.3%)
1	1 (4.2%)
2	3 (12.5%)
3	4 (16.7%)
4	10 (41.7%)
5	4 (16.7%)
	24 (100%)

Operational Procedures

Number of principal's instructional norms that teachers correctly perceived was determined by calculating the number of times at least two-thirds of the teachers accurately perceived the principal's agreement or disagreement to the following instructional practices:

- With many students, basic skills should be set aside until the students are ready to learn.
- Teachers should carefully plan their instruction in terms of specific, short-term objectives.
- Teachers should try to tailor instruction to the needs of individual students.
- Teachers should use diagnostic testing and concentrate on students' weak areas.
- Teachers should avail themselves of special help where needed (e.g., remedial teachers, counselors, etc.).

Table C-4. Numbers of Procedures to Integrate New Teachers

Number of Procedures	Number of Schools			
	School-Level		District-Level	
	Teachers' Reports	Principals' Reports	Teachers' Reports	Principals' Reports
0-1	4(16.7%)	1 (4.2%)	11(45.8%)	5(20.8%)
2-3	8(33.3%)	6(25.0%)	11(45.8%)	7(29.2%)
4-5	11(45.8%)	5(20.8%)	2 (8.3%)	2 (8.3%)
6-7	0	6(25.0%)	0	7(29.2%)
8-10	1 (4.2%)	6(25.0%)	0	3(12.5%)
	24(100%)	24(100%)	24(100%)	24(100%)

Operational Procedures

Teachers and principals were asked to indicate whether the following district-level and school-level procedures for integrating new teachers existed at their school:

- Orientation courses
- Conferences with administrative staff
- Conferences with other faculty
- Assignment of other faculty to provide guidance, etc.
- Special documentation on procedures and regulations
- Assignment of special clerical or administrative help for record-keeping
- Observation by other faculty
- Committees meeting in reference to special problems of students
- Inservice training
- New teacher observing classes of other faculty members

Number of procedures equals the sum of "yes" responses.

Table C-5. Numbers of Inconsistent Responses Given by Teachers and Principals to a List of Procedures to Integrate New Teachers

Number of Inconsistent Responses	Number of Schools	
	School-Level Procedures	District-Level Procedures
0-2	2 (8.3%)	6(25.0%)
3-4	9(37.5%)	13(54.1%)
5-6	7(29.2%)	3(12.5%)
7-8	6(25.0%)	1 (4.2%)
9-10	0	1 (4.2%)
	24(100%)	24(100%)

Operational Procedures

Number of inconsistent responses equals the sum of items (see Table C-4) for which the principal and at least two-thirds of the teachers gave different responses.

Table C-6. Numbers of Specialist-Teacher Contacts

Number of Contacts with Reading Specialist	Number of Schools	
	Teacher Reports	Principal Reports
0-1	4(16.7%)	4(16.7%)
2-3	15(62.5%)	11(45.8%)
4-5	5(20.8%)	9(37.5%)
	24(100%)	24(100%)

Number of Contacts with Math Specialist	Number of Schools	
	Teacher Reports	Principal Reports
0-1	14(58.3%)	14(58.3%)
2-3	8(33.3%)	8(33.3%)
4-5	2 (8.3%)	2 (8.3%)
	24(100%)	24(100%)

Operational Procedures

Number of contacts equals the sum of "yes" responses to the following items:

- Students are assigned on a regular basis to the specialist.
- The specialists can be called in to come in and help out in class.
- Students can be sent to the specialist at any time.
- The specialist confers with teachers on instructional methods and materials on a regular basis.
- The specialist confers with teachers on special problems, as requested by the teachers.

Table C-7. Numbers of Opportunities for Professional Development

Number of Opportunities	Number of Schools	
	Teacher Reports	Principal Reports
0-1	0	0
2-3	1 (4.2%)	0
4-5	4(16.7%)	2 (8.3%)
6-7	8(33.3%)	7(29.2%)
8-10	11(45.8%)	15(62.5%)
	24(100%)	24(100%)

Operational Procedures

Number of professional development opportunities provided by the school equals the sum of "yes" responses to the following:

- Subscribes to educational journals
- Gives teachers leave to attend professional meetings
- Helps defray expenses for meetings or courses
- Provides on-the-job training courses
- Holds in-school meetings on educational theories and concepts (may be associated with faculty meetings)
- Provides summer courses
- Brings in outside educational experts to provide lectures or seminars for teachers
- Ensures that teachers receive publishers' announcements of texts and materials
- Allows teachers discretion in materials to be used in class
- Provides weekend courses

Table C-8. Crosstabulation of Principal's Emphasis on Decisions Regarding Selection of Basic Instructional Materials by Reading and Math Achievement Gain

		Math Achievement Gain		
		High	Low	
Principal's Emphasis on Decisions Regarding Selection of Basic Instructional Materials	High	12(80.0)	3(20.0)	15(62.5)
	Low	2(22.2)	7(77.8)	9(37.5)
		14(58.3)	10(41.7)	24(100%)

$\phi = .48$ $\alpha \leq .02$

		Reading Achievement Gain		
		High	Low	
Principal's Emphasis on Decisions Regarding Selection of Basic Instructional Materials	High	7(46.7)	8(53.3)	15(62.5)
	Low	2(22.2)	7(77.8)	9(37.5)
		9(37.5)	15(62.5)	24(100%)

$\phi = .16$, NS

Operational Definitions

1. Principal's emphasis on decisions regarding selection of basic instructional materials:

   High = Ranked first among seven decision areas

   Low = Ranked second or lower among seven decision areas

2. Reading and math achievement gain 1974-1975:

   High = At least two of three grades tested showed improvement in national percentile ranks.

   Low = At least two of three grades tested showed no improvement in national percentile ranks.

Table C-9. Crosstabulation of Administrative Responsibility for Selecting Basic Instructional Materials by Reading and Math Achievement Gain

		Math Achievement Gain		
		High	Low	
Administrative Responsibility for Selecting Basic Instructional Materials	High	10(83.3)	2(16.7)	12(50.0)
	Low	4(33.3)	8(66.7)	12(50.0)
		14(58.3)	10(41.7)	24(100%)
		$\phi = .42$	$\alpha \leq .02$	

		Reading Achievement Gain		
		High	Low	
Administrative Responsibility for Selecting Basic Instructional Materials	High	6(50.0)	6(50.0)	12(50.0)
	Low	3(25.0)	9(75.0)	12(50.0)
		9(37.5)	15(62.5)	24(100%)
		$\phi = .13$, NS		

Operational Definitions

1. Administrative responsibility for selecting basic instructional materials:

   High = Teachers' estimates:
   Median score (3.4) and below on 5-point scale

   Low = Teachers' estimates:
   Above median score on 5-point scale

2. Reading and math achievement gain 1974-1975:

   High = At least two of three grades tested showed improvement in national percentile ranks.

   Low = At least two of three grades tested showed no improvement in national percentile ranks.

Table C-10. Crosstabulation of Accuracy of Teachers' Perceptions of Principal's Instructional Norms by Reading and Math Achievement Gain

		Math Achievement Gain		
		High	Low	
Accuracy of Teachers' Perceptions of Principal's Instructional Norms	High	11(78.6)	3(21.4)	14(58.3)
	Low	3(30.0)	7(70.0)	10(41.7)
		14(58.3)	10(41.7)	24(100%)

$\phi = .40$ $\alpha \leq .05$

		Reading Achievement Gain		
		High	Low	
Accuracy of Teachers' Perceptions of Principal's Instructional Norms	High	7(50.0)	7(50.0)	14(58.3)
	Low	2(20.0)	8(80.0)	10(41.7)
		9(37.5)	15(62.5)	24(100%)

$\phi = .22$, NS

Operational Definitions

1. Accuracy of teachers' perceptions of principal's instructional norms:

High = Teachers perceive principal's point of view on four or more of five specific teaching practices.

Low = Teachers perceive principal's point of view on less than four specific teaching practices.

2. Reading and math achievement gain 1974-1975:

High = At least two of three grades tested showed improvement in national percentile ranks.

Low = At least two of three grades tested showed no improvement in national percentile ranks.

Table C-11. Crosstabulation of Principal's Emphasis on Selection of Basic Instructional Materials by Administrative Responsibility for Selection of Basic Instructional Materials

		Administrative Responsibility for Selection of Basic Instructional Materials		
		High	Low	
Principal's Emphasis on Selection of Basic Instructional Materials	High	10(67.7)	5(33.3)	15(62.5)
	Low	2(22.2)	7(77.8)	9(37.5)
		12(50.0)	12(50.0)	24(100%)
		$\phi = .34$	$\alpha = .10$	

Operational Definitions

1. Principal's emphasis on decisions regarding selection of basic instructional materials:

   High = Ranked first among seven decision areas

   Low = Ranked second or lower among seven decision areas

2. Administrative responsibility for selection of basic instructional materials:

   High = Teachers' estimates:
   Median score (3.4) and below on 5-point scale

   Low = Teachers' estimates:
   Above median score on 5-point scale

Table C-12. Crosstabulation of Administrative Responsibility for Selecting Basic Instructional Materials by Accuracy of Teachers' Perceptions of Principal's Instructional Norms

		Accuracy of Teachers' Perceptions of Principal's Instructional Norms		
		High	Low	
Administrative Responsibility for Selecting Basic Instructional Materials	High	11(91.7)	1 (8.3)	12(50.0)
	Low	3(25.0)	8(75.0)	12(50.0)
		14(58.3)	10(41.7)	24(100%)

$\phi = .59$ $\alpha \leq .005$

Operational Definitions

1. Administrative responsibility for selecting basic instructional materials:

   High = Teachers' estimates:
   Median score (3.4) and below on 5-point scale

   Low = Teachers' estimates:
   Above median score on 5-point scale

2. Accuracy of teachers' perceptions of principal's instructional norms:

   High = Teachers perceive principal's point of view on four or more of five specific teaching practices.

   Low = Teachers perceive principal's point of view on less than four specific teaching practices.

Table C-13. Crosstabulation of Principal's Emphasis on Decisions Regarding Selection of Basic Instructional Materials by Accuracy of Teachers' Perceptions of Principal's Instructional Norms

		Accuracy of Teachers' Perceptions of Principal's Instructional Norms		
		High	Low	
Principal's Emphasis on Decisions Regarding Selection of Basic Instructional Materials	High	12(80.0)	3(20.0)	15(62.5)
	Low	2(22.2)	7(77.8)	9(37.5)
		14(58.3)	10(41.7)	24(100%)
		$\phi = .48$	$\alpha \leq .02$	

Operational Definitions

1. Principal's emphasis on decisions regarding selection of basic instructional materials:

   High = Ranked first among seven decision areas

   Low = Ranked second or less among seven decision areas

2. Accuracy of teachers' perceptions of principal's instructional norms:

   High = Teachers perceive principal's point of view on four or more of five specific teaching practices.

   Low = Teachers perceive principal's point of view on less than four specific teaching practices.

Table C-14. Crosstabulation of District-Level Support for New Teachers by Reading and Math Achievement Gain

		Math Achievement Gain		
		High	Low	
District-Level Support for New Teachers	High	11(84.6)	2(15.4)	13(54.2)
	Low	3(27.3)	8(72.7)	11(45.8)
		14(58.3)	10(41.7)	24(100%)

$\phi = .49$ $\alpha \leq .02$

		Reading Achievement Gain		
		High	Low	
District-Level Support for New Teachers	High	7(53.7)	6(46.2)	13(54.2)
	Low	2(18.2)	9(81.8)	11(45.8)
		19(37.5)	15(62.5)	24(100%)

$\phi = .28$, NS

Operational Definitions

1. District-level support for new teachers:

   High = Teachers report two or more of the 10 forms of support inquired about (see Table C-4).

   Low = Teachers report less than two forms of support inquired about.

2. Reading and math achievement gain 1974-1975:

   High = At least two of three grades tested showed improvement in national percentile ranks.

   Low = At least two of three grades tested showed no improvement in national percentile ranks.

APPENDIX D

TABLES FOR PARENT AND COMMUNITY INVOLVEMENT

Table D-1. Crosstabulation of the Parent Promotion Index by Frequency of Parent-Teacher Meetings

		Frequency of Parent-Teacher Meetings		
		High	Low	
Parent Promotion Index	High	9(69.2)	4(30.8)	13(56.5)
	Low	1(10.0)	9(90.0)	10(43.5)
		10(43.5)	13(56.5)	23(100%)
		$\phi = .50$	$\alpha = .02$	

Operational Definitions and Procedures

1. Frequency of parent-teacher meetings:

High = 9 or more per year
Low = 8 or less per year

2. Parent-Promotion Index:

High = 10 to 24
Low = 0 to 9

where items were scored as follows:

	Never	Once/year	More than once/year
• Notify all parents of open house for visiting classes	0	1	2
• Send home newsletters and other communications	0	1	2
• Hold pot-luck dinners	0	2	4
• Open the school evenings for community discussions of civic interest	0	2	4
• Bring in special speakers for evening forums	0	2	4
• Provide evening entertainment (films, plays, dance, music, etc.)	0	2	4
• Provide classes for parents	0	2	4

Highest Possible Total = 24

Table D-2. Crosstabulation of Paid Parent Aides by Number of Decision Areas in which Parents Participate

		Number of Decision Areas in which Parents Participate		
		Many	Few	
Paid Parent Aides	Yes	12(66.7)	6(33.3)	18(75.0)
	No	1(16.6)	5(83.4)	6(25.0)
		13(54.2)	11(45.8)	24(100%)
		$\phi = .34$	$\alpha = .10$	

Operational Definitions

1. Paid parent aides:

   Yes = At least one teacher reports paid parent aides in the classroom.

   No = No teacher reports paid parent aides.

2. Number of decision areas in which principal reports parents participate (i.e., curriculum, budget, and hiring and firing of teachers):

   Many = 2 or 3 areas

   Few = 0 or 1 area

Table D-3. Crosstabulation of Number of Decision Areas in which Parents Participate by Number of Capacities in which Parents Work at School

		Number of Capacities in which Parents Work at School		
		Many	Few	
Number of Decision Areas in which Parents Participate	Many	10(77.0)	3(23.0)	13(54.2)
	Few	4(36.4)	7(63.6)	11(45.8)
		14(58.3)	10(41.7)	24(100%)

$\phi = .33$, NS

Operational Definitions

1. Number of decision areas in which principal reports parents participate (i.e., curriculum, budget, and hiring and firing of teachers):

   Many = 2 or 3 areas

   Few = 0 or 1 area

2. Number of capacities in which principal reports parents work at school (i.e., teacher aides, clerks, volunteers, and advisory committee members):

   Many = 3 or 4 capacities

   Few = 0, 1, or 2 capacities

Table D-4. Crosstabulation of Number of Capacities in which Parents Work at School by Number of Homes Teachers Visit

		Number of Homes Teachers Visit		
		Many	Few	
Number of Capacities in which Parents Work at School	Many	8(57.2)	6(42.8)	14(58.3)
	Few	1(10.0)	9(90.0)	10(41.7)
		9(37.5)	15(62.5)	24(100%)
		$\phi = .39$	$\alpha = .05$	

Operational Definitions

1. Number of capacities in which principal reports parents work at school (i.e., teacher aides, clerks, volunteers, and advisory committee members):

   Many = 3 or 4 capacities

   Few = 0, 1, or 2 capacities

2. Number of homes teachers visit per month:

   Many = 2 or more homes

   Few = 0 or 1 home

Table D-5. Crosstabulation of Administrative Responsibility for Policy Decisions in General by Parent Participation

		Parent Participation		
		High	Low	
Administrative Responsibility for Policy Decisions in General	High	10(66.7)	5(33.3)	15(62.5)
	Low	2(22.2)	7(77.8)	9(37.8)
		12(50.0)	12(50.0)	24(100%)

$\phi = .34$ $\alpha \leq .09$

Operational Definitions

1. Administrative responsibility for policy decisions in general:

High = Teachers' estimates:
1.0 to 3.4 on 5-point scale

Low = Teachers' estimates:
3.5 to 5.0 on 5-point scale

2. Parent participation:

High = Median score (10) and above on
Parent-School Interaction Index

Low = Below median score on
Parent-School Interaction Index

Table D-6. Crosstabulation of Administrative Responsibility for Selection of Basic Instructional Materials by Parent Participation

		Parent Participation		
		High	Low	
Administrative Responsibility for Selection of Basic Instructional Materials	High	9(75.0)	3(25.0)	12(50.0)
	Low	3(25.0)	9(75.0)	12(50.0)
		12(50.0)	12(50.0)	24(100%)
		$\phi = .43$	$\alpha \leq .04$	

Operational Definitions

1. Administrative responsibility for selection of basic instructional materials:

   High = Teachers' estimates:
   Median score (3.4) and below on 5-point scale

   Low = Teachers' estimates:
   Above median score on 5-point scale

2. Parent participation:

   High = Median score (10) and above on
   Parent-School Interaction Index

   Low = Below median score on
   Parent-School Interaction Index

Table D-7. Crosstabulation of Administrative Responsibility for Decisions Concerning School/Community Interaction by Parent Participation

		Parent Participation		
		High	Low	
Administrative Responsibility for Decisions Concerning School/Community Interaction	High	8(67.7)	4(33.3)	12(50.0)
	Low	4(33.3)	8(67.7)	12(50.0)
		12(50.0)	12(50.0)	24(100%)

$\phi = .33$, NS

Operational Definitions

1. Administrative responsibility for decisions concerning school/ community interaction:

   High = Teachers' estimates:
   1.0 to 2.9 on 5-point scale

   Low = Teachers' estimates:
   3.0 to 5.0 on 5-point scale

2. Parent participation:

   High = Median score (10) and above on
   Parent-School Interaction Index

   Low = Below median score on
   Parent-School Interaction Index

Table D-8. Crosstabulation of the Subset Index of Parent Involvement in the Classroom by Math and Reading Achievement Gain

Math Achievement Gain

		High	Low	
Subset Index of Parent Involvement in the Classroom	High	11(84.6)	2(15.4)	13(54.2)
	Low	3(27.3)	8(72.7)	11(45.8)
		14(58.3)	10(41.7)	24(100%)

$\phi = .49$ $\alpha \leq .02$

Reading Achievement Gain

		High	Low	
Subset Index of Parent Involvement in the Classroom	High	7(53.8)	6(46.2)	13(54.2)
	Low	2(18.2)	9(81.8)	11(45.8)
		9(37.5)	15(62.5)	24(100%)

$\phi = .28$, NS

Operational Definitions

1. Subset Index of Parent Involvement in the Classroom (see Table D-9):

   High = 5 or 6
   Low = 0 to 4

2. Reading and math achievement gain 1974-1975:

   High = At least two of three classes tested showed improvement in national percentile ranks.

   Low = At least two of three classes tested showed no improvement in national percentile ranks.

Table D-9. Distribution of Scores on the Subset Index of Parent Involvement in the Classroom

Scores	Number of Schools
0-2	5 (20.8%)
3-4	6 (25.0%)
5-6	13 (54.2%)
	24 (100%)

Operational Definitions and Procedures

Subset Index of Parent Involvement in the Classroom was created by summing scores to the following items:

1. The school employs paid parent classroom aides:

   2 = Yes
   0 = No

2. Parents visit the classroom at the teacher's request:

   2 = Yes, two or more visits per month
   1 = Yes, one visit per month
   0 = Less than one visit per month

3. Parents visit the classroom at their own initiative:

   2 = Yes, two or more visits per month
   1 = Yes, one visit per month
   0 = Less than one visit per month

APPENDIX E

TABLES FOR READING AND MATH INSTRUCTIONAL PRACTICES AND TEACHER ATTITUDES

Table E-1. Crosstabulation of Use of Interrelated Objectives in Lesson Plans by Use of Reading/Math Records Showing Attainment of Specific Instructional Objectives

		Use of Reading Records Showing Attainment of Specific Instructional Objectives		
		Yes	No	
Use of Interrelated Objectives in Lesson Plans	Yes	7(87.5)	1(12.5)	8(33.3)
	No	4(25.0)	12(75.0)	16(66.7)
		11(45.8)	13(54.2)	24(100%)

$\phi = .50$ $\alpha = .01$

		Use of Math Records Showing Attainment of Specific Instructional Objectives		
		Yes	No	
Use of Interrelated Objectives in Lesson Plans	Yes	5(62.5)	3(37.5)	8(33.3)
	No	5(31.3)	11(68.7)	16(66.7)
		10(41.7)	14(58.3)	24(100%)

$\phi = .21$, NS

Operational Definitions

1. Use of interrelated objectives in lesson plans (observer inspection):

   Yes = Interrelated objectives are contained in reading and math lesson plans.

   No = Interrelated objectives are absent from reading and/or math lesson plans.

2. Use of records showing attainment of specific instructional objectives (interview):

   Yes = Teachers maintain records.

   No = Teachers do not maintain records.

Table E-2. Crosstabulation of Importance of Behavioral Objectives by Use of Reading/Math Records Showing Attainment of Specific Instructional Objectives

		Use of Reading Records Showing Attainment of Specific Instructional Objectives		
		Yes	No	
Importance of Behavioral Objectives	High	8(66.7)	4(33.3)	12(50.0)
	Low	3(25.0)	9(75.0)	12(50.0)
		11(45.8)	13(54.2)	24(100%)

$\phi = .33$ $\alpha = .10$

		Use of Math Records Showing Attainment of Specific Instructional Objectives		
		Yes	No	
Importance of Behavioral Objectives	High	7(58.3)	5(41.7)	12(50.0)
	Low	3(25.0)	9(75.0)	12(50.0)
		10(41.7)	14(58.3)	24(100%)

$\phi = .25$, NS

Operational Definitions

1. Importance teachers attach to behavioral objectives:

   High = Median score and above

   Low = Below median score

2. Use of records showing attainment of specific instructional objectives (interview):

   Yes = Teachers maintain records.

   No = Teachers do not maintain records.

Table E-3. Crosstabulation of Importance of Revising Lesson Plans by Use of Reading/Math Records Showing Attainment of Specific Instructional Objectives

		Use of Reading Records Showing Attainment of Specific Instructional Objectives		
		Yes	No	
Importance Teachers Attach to Revising Lesson Plans	High	7(70.0)	3(30.0)	10(41.7)
	Low	4(28.5)	10(71.5)	14(58.3)
		11(45.8)	13(54.2)	24(100%)

$\phi = .33$, NS

		Use of Math Records Showing Attainment of Specific Instructional Objectives		
		Yes	No	
Importance Teachers Attach to Revising Lesson Plans	High	7(70.0)	3(30.0)	10(41.7)
	Low	3(21.4)	11(78.6)	14(58.3)
		10(41.5)	14(58.3)	24(100%)

$\phi = .40$ $\alpha \leq .05$

Operational Definitions

1. Importance teachers attach to revising lesson plans:

   High = Item score: .30 and above on scale of ± 1.0

   Low = Item score: .29 and below on scale of ± 1.0

2. Use of records showing attainment of specific instructional objectives (interview):

   Yes = Teachers maintain records.

   No = Teachers do not maintain records.

Table E-4. Crosstabulation of Use of Objectives for Reading/Math Instruction by Reading and Math Achievement Gain

		Reading Achievement Gain		
		High	Low	
Use of Objectives for Reading Instruction	High	8(66.7)	4(33.3)	12(50.0)
	Low	1 (8.3)	11(91.7)	12(50.0)
		9(37.5)	15(62.5)	24(100%)
		$\phi = .52$	$\alpha \leq .01$	

		Math Achievement Gain		
		High	Low	
Use of Objectives for Math Instruction	High	10(90.9)	1 (9.1)	11(45.8)
	Low	4(30.8)	9(69.2)	13(54.2)
		14(58.3)	10(41.7)	24(100%)
		$\phi = .52$	$\alpha \leq .01$	

Operational Definitions

1. Use of objectives for reading/math instruction (see Table V-2):

   High = Index score: 2 or 3

   Low = Index score: 0 or 1

2. Reading and math achievement gain 1974-1975:

   High = At least two of three grades tested showed improvement in national percentile ranks.

   Low = At least two of three grades tested showed no improvement in national percentile ranks.

Table E-5. Crosstabulation of Use of Reading/Math Records Showing Attainment of Specific Instructional Objectives by Reading and Math Achievement Gain

		Reading Achievement Gain		
		High	Low	
Use of Reading Records Showing Attainment of Specific Instructional Objectives	Yes	7(63.6)	4(36.4)	11(45.8)
	No	2(15.4)	11(84.6)	13(54.2)
		9(37.5)	15(62.5)	24(100%)
		$\phi = .41$	$\alpha \leq .04$	

		Math Achievement Gain		
		High	Low	
Use of Math Records Showing Attainment of Specific Instructional Objectives	Yes	9(90.0)	1(10.0)	10(41.7)
	No	5(35.7)	9(64.3)	14(58.3)
		14(58.3)	10(41.7)	24(100%)
		$\phi = .46$	$\alpha \leq .03$	

Operational Definitions

1. Use of records showing attainment of specific instructional objectives (interview):

   Yes = Teachers maintain records.

   No = Teachers do not maintain records.

2. Reading and math achievement gain 1974-1975:

   High = At least two of three grades tested showed improvement in national percentile ranks.

   Low = At least two of three grades tested showed no improvement in national percentile ranks.

Table E-6. Crosstabulation of Adequacy of Practice by Reading Achievement Gain

		Reading Achievement Gain		
		High	Low	
Adequacy of Practice	Yes	9(56.2)	7(43.8)	16(66.7)
	No	0 (0.0)	8(100.0)	8(33.3)
		9(37.5)	15(62.5)	24(100%)
		$\phi = .46$	$\alpha \leq .03$	

Operational Definitions

1. Adequacy of practice during both reading and math instruction:

High = Item score: 3 or 4
Low = Item score: 1 or 2

2. Reading achievement gain 1974-1975:

High = At least two of three grades tested showed improvement in national percentile ranks.
Low = At least two of three grades tested showed no improvement in national percentile ranks.

Table E-7. Crosstabulation of Task-Oriented Feedback by Reading and Math Achievement Gain

		Reading Achievement Gain		
		High	Low	
Task-Oriented Feedback	High	8(50.0)	8(50.0)	16(66.7)
	Low	1(12.5)	7(87.5)	8(33.3)
		9(37.5)	15(62.5)	24(100%)

$\phi = .27$, NS

		Math Achievement Gain		
		High	Low	
Task-Oriented Feedback	High	11(68.7)	5(31.3)	16(66.7)
	Low	3(37.5)	5(62.5)	8(33.3)
		14(58.3)	10(41.7)	24(100%)

$\phi = .21$, NS

Operational Definitions

1. Task-oriented feedback:

High = Use of three forms of feedback
Low = Use of less than three forms of feedback

2. Reading and math achievement gain 1974-1975:

High = At least two of three grades tested showed improvement in national percentile ranks.

Low = At least two of three grades tested showed no improvement in national percentile ranks.

Table E-8. Crosstabulation of Use of Praise by Reading Achievement Gain

		Reading Achievement Gain		
		High	Low	
Use of Praise	Infrequent	8(57.1)	6(42.9)	14(58.3)
	Frequent	1(10.0)	9(90.0)	10(41.7)
		9(37.5)	15(62.5)	24(100%)
		$\phi = .39$	$\alpha = .05$	

Operational Definitions

1. Use of praise:

Infrequent = Item score: 1 or 2
Frequent = Item score: 3 or 4

2. Reading achievement gain 1974-1975:

High = At least two of three grades tested showed improvement in national percentile ranks.

Low = At least two of three grades tested showed no improvement in national percentile ranks.

Table E-9. Crosstabulation of Pointing Out Students as Positive Models by Reading and Math Achievement Gain

		Reading Achievement Gain		
		High	Low	
Pointing Out Students as Positive Models	Infrequent	7(58.3)	5(41.7)	12(50.0)
	Frequent	2(16.7)	10(83.3)	12(50.0)
		9(37.5)	15(62.5)	24(100%)
		$\phi = .34$	$\alpha = .09$	

		Math Achievement Gain		
		High	Low	
Pointing Out Students as Positive Models	Infrequent	9(75.0)	3(25.0)	12(50.0)
	Frequent	5(41.7)	7(58.3)	12(50.0)
		14(58.3)	10(41.7)	24(100%)
		$\phi = .25$, NS		

Operational Definitions

1. Pointing out students as positive models:

Infrequent = Item score: 1 or 2
Frequent = Item score: 3 or 4

2. Reading and math achievement gain 1974-1975:

High = At least two of three grades tested showed improvement in national percentile ranks.

Low = At least two of three grades tested showed no improvement in national percentile ranks.

Table E-10. Crosstabulation of Use of Praise and Pointing Out Students as Positive Models by Reading and Math Achievement Gain

		Reading Achievement Gain		
		High	Low	
Use of Praise and Pointing Out Students as Positive Models	Infrequent	7(70.0)	3(30.0)	10(41.7)
	Frequent	2(14.3)	12(85.7)	14(58.3)
		9(37.5)	15(62.5)	24(100%)
		$\phi = .48$	$\alpha \leq .02$	

		Math Achievement Gain		
		High	Low	
Use of Praise and Pointing Out Students as Positive Models	Infrequent	8(80.0)	2(20.0)	10(41.7)
	Frequent	6(42.9)	8(57.1)	14(58.3)
		14(58.3)	10(41.7)	24(100%)
		$\phi = .29$, NS		

Operational Definitions

1. Use of praise and pointing out students as positive models:

   Infrequent = Item score: 1 or 2

   Frequent = Item score: 3 or 4

2. Reading and math achievement gain 1974-1975:

   High = At least two of three grades tested showed improvement in national percentile ranks.

   Low = At least two of three grades tested showed no improvement in national percentile ranks.

Table E-11. Crosstabulation of Teacher Expectations for Grade-Level Achievement by Use of Praise and by Pointing Out Students as Positive Models

		Teacher Expectations for Grade-Level Achievement		
		High	Low	
Use of Praise	Infrequent	11(78.6)	3(21.4)	14(58.3)
	Frequent	4(40.0)	6(60.0)	10(41.7)
		15(62.5)	9(37.5)	24(100%)

$\phi = .31$, NS

		Teacher Expectations for Grade-Level Achievement		
		High	Low	
Pointing Out Students as Positive Models	Infrequent	10(83.3)	2(16.7)	12(50.0)
	Frequent	5(41.7)	7(58.3)	12(50.0)
		15(62.5)	9(37.5)	24(100%)

$\phi = .34$ $\alpha \leq .09$

Operational Definitions

1. Use of praise/pointing out students as positive models:

   Infrequent = Item score: 1 or 2

   Frequent = Item score: 3 or 4

2. Teacher expectations for grade-level achievement:

   High = Scale score: 1.0 to 2.0

   Low = Scale score: 0 to .83

Table E-12. Crosstabulation of Emphasis by Teachers on Psycho-Emotional Goals by Math Achievement Gain

		Math Achievement Gain		
		High	Low	
Emphasis by Teachers on Psycho-Emotional Goals	Low	9(81.9)	2(18.1)	11(45.8)
	High	5(36.9)	8(63.1)	13(54.2)
		14(58.3)	10(41.7)	24(100%)
		$\phi = .35$	$\alpha = .08$	

Operational Definitions

1. Emphasis by teachers on psycho-emotional goals (see Table C-1):

Low = Score: 0 to 75

High = Score: 80 to 90

2. Math achievement gain 1974-1975:

High = At least two of three grades tested showed improvement in national percentile ranks.

Low = At least two of three grades tested showed no improvement in national percentile ranks.

Table E-13. Crosstabulation of Adequacy of Practice by Use of Praise

		Use of Praise		
		Infrequent	Frequent	
Adequacy of Practice	High	12(75.0)	4(25.0)	16(66.7)
	Low	2(25.0)	6(75.0)	8(33.3)
		14(58.3)	10(41.7)	24(100%)
		$\phi = .39$	$\alpha = .06$	

Operational Definitions

1. Adequacy of practice during both reading and math instruction:

    High = Item score: 3 or 4
    Low = Item score: 1 or 2

2. Use of praise:

    Infrequent = Item score: 1 or 2
    Frequent = Item score: 3 or 4

Table E-14. Crosstabulation of Use of Positive Reinforcement by Task-Oriented Feedback

		Task-Oriented Feedback		
		High	Low	
Use of Positive Reinforcement	Low	11(91.7)	1 (8.3)	12(50.0)
	High	5(41.7)	7(58.3)	12(50.0)
		16(66.7)	8(33.3)	24(100%)
		$\phi = .44$	$\alpha \leq .03$	

Operational Definitions

1. Use of positive reinforcement:

   Low = Less than 80% of observed reinforcement was positive.

   High = At least 80% of observed reinforcement was positive.

2. Task-oriented feedback:

   High = Use of three forms of feedback

   Low = Use of less than three forms of feedback

Table E-15. Crosstabulation of Teachers' Expectations for Student Achievement by Importance Attached to Use of Behavioral Objectives

		Importance of Behavioral Objectives		
		High	Low	
Teachers' Expectations for Student Achievement	High	10(62.5)	6(37.5)	16(66.7)
	Low	2(25.0)	6(75.0)	8(33.3)
		12(50.0)	12(50.0)	24(100%)

ϕ = .33, NS

Operational Definitions

1. Teachers' expectations for student achievement (obtaining high school diploma):

High = Scale score: 1.0 to 2.0
Low = Scale score: 0 to .99

2. Importance teachers attach to behavioral objectives:

High = Median score or above
Low = Below median score

Table E-16. Crosstabulation of Teachers' Expectations for Student Achievement by Adequacy of Practice and Task-Oriented Feedback

		Adequacy of Practice and Task-Oriented Feedback		
		High	Low	
Teachers' Expectations for Student Achievement	High	10(62.5)	6(37.5)	16(66.7)
	Low	1(12.5)	7(87.5)	8(33.3)
		11(45.8)	13(54.2)	24(100%)
		$\phi = .38$	$\alpha \leq .06$	

Operational Definitions

1. Teachers' expectations for student achievement (obtaining high school diploma):

   High = Scale score: 1.0 to 2.0

   Low = Scale score: 0 to .99

2. Adequacy of practice and task-oriented feedback:

   High = Practice adequate (item score: 3 or 4) in both reading and math, and feedback rated high (three forms of feedback provided).

   Low = Practice not adequate (item score: 1 or 2) in either reading or math, and/or feedback not high (less than three forms of feedback provided).

APPENDIX F

TABLES FOR EQUALITY OF EDUCATIONAL OPPORTUNITY

Table F-1. Crosstabulation of Intergroup Mixing During Recess by Intergroup Mixing During Lunch

		Intergroup Mixing During Lunch		
		Yes	No	
Intergroup Mixing During Recess	Yes	12(92.3)	1 (7.7)	13(81.2)
	No	1(33.3)	2(66.7)	3(18.8)
		13(81.2)	3(18.8)	16(100%)

$\alpha \leq .07$

Operational Definitions

Items assessing intergroup mixing during recess and lunch were based on observer judgments.

Table F-2. Crosstabulation of Student Intergroup Mixing by Segregated Seating Patterns in Desegregated Classes

		Student Intergroup Mixing		
		Yes	No	
Segregated Seating Patterns in Desegregated Classes	Yes	3(42.9)	4(57.1)	7(43.8)
	No	9(100.0)	0 (0.0)	9(56.2)
		12(75.0)	4(25.0)	16(100%)

$\alpha \leq .02$

Operational Definitions and Procedures

1. Student intergroup mixing:

   Yes = Student intergroup mixing was observed during recess and lunch.

   No = Student intergroup mixing was not observed during recess and/or lunch.

2. Segregated seating patterns in desegregated classes:

   Yes = Chi-square or Fisher's Exact Test of seating charts indicates non-random seating arrangement in at least one observed class that was desegregated.

   No = Chi-square or Fisher's Exact Test of seating charts indicates random seating arrangement in all observed classes that were desegregated.

Table F-3. Crosstabulation of Principal's Emphasis on Social Goals by Amount of Student Intergroup Mixing

		Student Intergroup Mixing		
		Yes	No	
Principal's Emphasis on Social Goals	High	7(100.0)	0 (0.0)	7(43.8)
	Low	5(55.6)	4(44.4)	9(56.2)
		12(75.0)	4(25.0)	16(100%)

$\alpha = .07$

Operational Definitions

1. Principal's emphasis on social goals:

High = At least two social goals ranked higher than fourth out of a list of 13 school goals.

Low = Less than two social goals were ranked higher than fourth out of a list of 13 social goals.

2. Student intergroup mixing:

Yes = Student intergroup mixing was observed during recess and lunch.

No = Student intergroup mixing was not observed during recess and/or lunch.

Table F-4. Crosstabulation of Principal's Emphasis on Social Goals by Minority Students' Exposure to Negative Teacher Behavior

		Minority Students More Likely to Receive Negative Teacher Behavior*		
		Yes	No	
Principal's Emphasis on Social Goals	Low	6(85.7)	1(14.3)	7(58.3)
	High	1(20.0)	4(80.0)	5(41.7)
		7(58.3)	5(41.7)	12(100%)

α = .05

Operational Definitions

1. Principal's emphasis on social goals:

   Low = Less than two social goals were ranked higher than fourth out of a list of 13 school goals.

   High = At least two social goals ranked higher than fourth out of a list of 13 school goals.

2. Minority students more likely to receive negative teacher behavior:

   Yes = Minority students in observed classes received at least 10 percent more than their proportional share of negative teacher behavior.

   No = Minority students in observed classes received their proportional share or less of negative teacher behavior.

*Analysis in four desegregated elementary schools was not possible because of insufficient data on negative teacher behavior.

Table F-5. Crosstabulation of Teacher Participation in Decisions Regarding Intercultural Curricula by Observed Use of Multi-Ethnic Materials

		Observed Use of Multi-Ethnic Materials		
		More	Less	
Teacher Participation in Decisions Regarding Intercultural Curricula	High	6(100.0)	0 (0.0)	6(37.5)
	Low	3(30.0)	7(70.0)	10(62.5)
		9(56.2)	7(43.8)	16(100%)
			$\alpha \leq .01$	

Operational Definitions

1. Teacher participation in decisions regarding intercultural curricula:

High = Teacher estimates:
4 or 5 on 5-point scale

Low = Teacher estimates:
1 to 3 on 5-point scale

2. Observed use of multi-ethnic materials:

More = Not more than one of the observed classes had no multi-ethnic materials.

Less = At least two of the observed classes had no multi-ethnic materials.

Table F-6. Crosstabulation of Representative Parent Visits to School by Observed Use of Multi-Ethnic Materials

		Observed Use of Multi-Ethnic Materials		
		More	Less	
Parent Visitors Were Representative of Racial/Ethnic Mix of Student Body	Yes	6(75.0)	2(25.0)	8(50.0)
	No	2(25.0)	6(75.0)	8(50.0)
		8(50.0)	8(50.0)	16(100%)
			α = .07	

Operational Definitions

1. Representativeness of parent visits to school:

   Yes = Principals report that parent visitors were representative of the racial/ethnic mix of the student body.

   No = Principals report that parent visitors were not representative of the racial/ethnic mix of the student body.

2. Observed use of multi-ethnic materials:

   More = At least one class uses a great deal of material depicting racial/ethnic interaction.

   Less = No classes use a great deal of material depicting racial/ethnic interaction.

Table F-7. Crosstabulation of Representative Parent Visits to School by Student Perceptions of Teacher-Student Interaction

		Student Perceptions of Teacher-Student Interaction*		
		Positive Gain	Negative or No Gain	
Parent Visitors Were Representative of Racial/Ethnic Mix of Student Body	Yes	6(85.7)	1(14.3)	7(46.7)
	No	2(25.0)	6(75.0)	8(53.3)
		8(53.3)	7(46.7)	15(100%)
			α = .03	

Operational Definitions

1. Representativeness of parent visits to school:

Yes = Principals report that parent visitors were representative of the racial/ethnic mix of the student body.

No = Principals report that parent visitors were not representative of the racial/ethnic mix of the student body.

2. Student perceptions of teacher-student interaction:

Positive Gain = Average school-level gain score on the Teacher-Student Interaction Scale was positive.

Negative or No Gain = Average school-level gain score on the Teacher-Student Interaction Scale was negative or showed no gain.

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*Teacher-Student Interaction data was missing for one school.

Table F-8. Crosstabulation of Minority Student Exposure to Negative Teacher Behavior by Reading Achievement Gain

		Reading Achievement Gain		
		High	Low	
Minority Students More Likely to Receive Negative Teacher Behavior*	Yes	0 (0.0)	5(100.0)	5(41.7)
	No	4(57.1)	3(42.9)	7(58.3)
		4(33.3)	8(66.7)	12(100%)
			$\alpha \leq .07$	

Operational Definitions

1. Minority students more likely to receive negative teacher behavior:

Yes = Minority students in observed classes received at least 10 percent more than their proportional share of negative teacher behavior.

No = Minority students in observed classes received their proportional share or less of negative teacher behavior.

2. Reading achievement gain 1974-1975:

High = At least two of three grades tested showed improvement in national percentile ranks.

Low = At least two of three grades tested did not show improvement in national percentile ranks.

*Analysis in four desegregated elementary schools was not possible because of insufficient data on negative teacher behavior.

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